

## Original Article

# Analysis of rehabilitation in stroke patients in a High Dependency Unit

Huimin Yu<sup>1\*</sup>, Ying He<sup>2\*</sup>, Shuangmei Liu<sup>1</sup>, Yonghua Yang<sup>1</sup>, Wenxian Yang<sup>1</sup>, Liqing Yao<sup>2</sup>, Shaokun Lv<sup>1</sup>

<sup>1</sup>Department of Rehabilitation Medicine, Qujing No. 1 Hospital, Qujing, Yunnan Province, China; <sup>2</sup>Department of Rehabilitation Medicine, The Second Affiliated Hospital of Kunming Medical University, Kunming, Yunnan Province, China. \*Equal contributors and co-first authors.

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**Abstract:** Objective: To analyze the rehabilitation effect of stroke patients in the High Dependency Unit (HDU). Methods: A retrospective study was conducted on 96 ischemic stroke patients who met the inclusion criteria and were hospitalized in the Department of Rehabilitation Medicine of Qujing No. 1 Hospital by convenience sampling. All patients were divided into two groups according to the inclusion and exclusion criteria: experimental group (n=49) and control group (n=47). The experimental group was admitted to the HDU and treated with the whole-process of full cycle rehabilitation management and treatment, and the control group was admitted to the general ward and treated with the conventional treatment model of the Department of Rehabilitation Medicine. Results: The improvement of muscle strength at discharge was compared between the two groups. The results showed that the muscle strength effective rate was 85.7% in the experimental group and 55.3% in the control group, and the difference had statistical significance (P<0.01). The Barthel index score at admission and at discharge were compared between the two groups, the results showed that there was no significant difference in the Barthel index score at admission between the two groups (t=0.668, P>0.05). The Barthel index score at discharge in the experimental group was higher than that in the control group, and the difference had statistical significance (t=7.969, P<0.05). The Montreal Cognitive Assessment (MoCA) score of the experimental group before treatment was (25.67±3.11) points, and the MoCA score after treatment was (29.01±2.21) points; the MoCA score of the control group before treatment was (24.11±4.65) points, and the MoCA score after treatment was (25.35±2.29) points. After implementation of the clinical nursing pathway, the improvement in cognitive function in the experimental group of patients was significantly higher than that in the control group, and the difference had statistical significance (P<0.01). Through the investigation of the satisfaction rate of nursing work in the two groups, it was found that the satisfaction rate in the experimental group was better than that in the control group, and the difference had statistical significance (P<0.05); there was 1 case of pressure sores that occurred in the experimental group, and 3 cases that occurred in the control group,  $\chi^2=1.133$ , P=0.287, and the difference had no statistical significance (P>0.05). The length of hospital stay was compared between the two groups, the results showed that the length of hospital stay was (11.76±2.06) days in the experimental group and (14.21±2.40) days in the control group, thus, the average length of hospital stay in the experimental group was less than that in the control group, and the difference had statistical significance (P<0.001). Conclusion: The whole-process of full cycle rehabilitation management and treatment can improve the activities of daily living, limb muscle strength and cognitive function of patients, as well as shorten the length of hospital stay and improve the satisfaction of patients with treatment. Thus, it is worthy of being widely popularized in clinical application.

**Keywords:** Intensive rehabilitation, High Dependency Unit, stroke, rehabilitation efficacy

### Introduction

Stroke is a neurological deficit syndrome with symptoms lasting for at least 24 hours. There are about 3 million new stroke patients each year in China, of which 70%-80% have loss of physical ability due to various types of dysfunction

[1]. In clinical treatment, most stroke patients are elderly, with a long treatment time, large amount of trauma, and a high incidence of complications after treatment; hemiplegia is one of the main complications, and such patients are prone to malnutrition and pessimistic negative emotions, which seriously affects the

rehabilitation of patients [2, 3]. In the traditional treatment mode, although the stroke population has been treated, attention is not paid to post-discharge treatment, there are often treatment errors, resulting in very low treatment efficiency and thus, medical care is unable to accurately provide treatment services for such a population. Therefore, stroke rehabilitation is a very important treatment, which can not only ensure the life and health and medication safety of stroke patients, but also further improve the equalization of basic public health services in China. Thus, how to provide better treatment for such patients and ensure the safety and reliability of such populations in medical services has become an urgent problem for hospitals [4].

As a treatment method, whole-process full cycle rehabilitation management and treatment can timely and effectively prevent or reduce the negative emotions of stroke rehabilitation patients and reduce complications [5]. Studies at home and abroad have confirmed that early, timely and reasonable intervention for critically ill patients is of great significance in preventing complications and secondary disability, improving prognosis and shortening the course of disease. The early and intensive care rehabilitation work in China mainly includes: rehabilitation implemented by individuals for critically ill patients in the rehabilitation wards of a very small number of hospitals; rehabilitation professionals enter the ICU or clinical specialty to implement bedside rehabilitation for a small proportion of critically ill patients; or irregular rehabilitation treatment with points and surfaces implemented by the rehabilitation personnel established in some specialties (such as neurology, orthopedics, etc.) for critically ill patients in their care, and most patients do not receive early rehabilitation in any real sense [6]. On the basis of this situation, in this survey and study, 96 ischemic stroke patients who were hospitalized in the Department of Rehabilitation Medicine of Qijing No. 1 Hospital from May 2020 to October 2020 and who met the inclusion criteria were selected as the study subjects to explore the therapeutic effect of community continuous treatment for stroke rehabilitation patients after discharge. The details are reported as follows.

### Materials and methods

#### General data

A convenience sampling method was used to select 96 ischemic stroke patients who were hospitalized in the Department of Rehabilitation Medicine of Qijing No. 1 Hospital from May 2020 to October 2020 and met the inclusion criteria for a retrospective study. According to the inclusion and exclusion criteria, all patients were divided into two groups: experimental group (n=49) and control group (n=47). The experimental group was admitted to the High Dependency Unit (HDU) and treated with whole-process full cycle rehabilitation management and treatment, and the control group was admitted to the general ward and treated with the conventional treatment model of the Department of Rehabilitation Medicine. This study was approved by the Ethics Committee of Qijing No. 1 Hospital.

Inclusion criteria: (1) Meet the diagnostic criteria of western medicine in the Chinese Guidelines for the Diagnosis and Treatment of Acute Ischemic Stroke 2014; (2) Conscious, no communication barriers, no mental retardation (NEVISE>24) or language barriers; (3) Voluntarily participated in this study.

Exclusion criteria: (1) transient ischemic attack; (2) cavitory or massive cerebral infarction; (3) reversible ischemic neurological deficit (RIND); (4) heart, brain, liver and kidney dysfunction; (5) death or other serious complications.

#### Methods

*Control group:* Control group: admitted to the general ward, using the conventional treatment mode of the Department of Rehabilitation Medicine, such as regular distribution of health brochures, to understand the recovery of stroke rehabilitation, provided professional guidance for the rehabilitation of stroke rehabilitation patients.

*Experimental group:* Admitted to the HDU, on the basis of the control group, whole-process full cycle rehabilitation management and treatment was conducted.

The first care point was environmental intervention, which requires maintaining appropri-

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ate air circulation, humidity, and temperature in the patient's environment and maintaining adequate indoor sunlight. Bookshelves can be added, with disease prevention and health care brochures placed on the bookshelves, and some soothing music can also be played to give patients and their families a cordial and warm feeling.

The second is emotional intervention, personnel have direct contact with the patient during the treatment, and the first impression left by the treatment personnel will directly affect the patient's subsequent attitude. Therefore, when taking corresponding therapeutic measures, the therapeutic personnel should smile, use popular and cordial language to effectively communicate with the patients, treat the patients affably, have a gentle tone, and give the patients encouragement and comfort, so as to reduce the patient's fear and tension [7].

The third point is behavioral intervention, nurses can provide encouragement through text, posters, health lectures and other forms of health education for patients before admission, in order to explain the specific circumstances to patients in detail, as far as possible to reduce the psychological adverse emotions of patients and avoid patients becoming worried. Advice for increasing the patient's activities during the day, reduce the patient's daytime sleep, and perform sleep promoting therapy for the patient before going to bed at night, such as playing soft light music, so as to help the patient fall asleep early. In addition, staff can inform the patient's family to give the patient sincere care and concern, so that the patient can feel the warmth from the family and prevent the patient's adverse psychology such as abandonment. Nurses need to reasonably match the diet according to the treatment of patients and their own individual situation, as well as strictly control the patient's dietary indicators, while allowing patients to maintain good sleep, where it is best to go to bed early and get up early, which is conducive to helping patients to control the relevant indicators and reduce the occurrence of complications.

### *Evaluation indicators*

Comparison of activities of daily living: Barthel index score was used to evaluate the activities of daily living of the two groups at admission and discharge. Activities of daily living (ADL)

were assessed using the Barthel index of ADL scale, which was designed and applied in clinical practice by Florence Mahoney and Dorothy Barthel, USA, with a total of 10 assessment items: defecation, urination, modification, toilet use, eating, movement, activity (walking), dressing, stairs, and bathing. According to the degree of self-care, the scores are divided into four levels: 0, 5, 10 and 15. The total score is 100 points. The higher the score, the better the patient's function. The Barthel Index Rating Scale is very widely used in stroke patients with good reliability and validity [8].

Comparison of muscle strength efficacy: Through the evaluation criteria of limb muscle strength efficacy, the treatment efficacy of the two groups of patients at discharge was compared.

Comparison of cognitive function: Montreal Cognitive Assessment (MoCA) was used to compare the cognitive ability of the two groups before and after treatment. The scale was set up by the Nasreddine Reference Mini-Mental State Examination (MMSE) cognitive items and scoring criteria in 1999 [9]. The test contents of this table include relevant examinations such as visuospatial/executive function, delayed recall ability, orientation, naming, attention, language ability and abstract ability. The total score is 30 points. For those with less than 12 years of education, add 1 point to the test results. A test score of  $\geq 26$  is normal. Less than 26 points indicates cognitive dysfunction. The scale has good sensitivity and specificity, and good validity, with Cronbach's  $\alpha$  of 0.93 and utility validity of 0.85.

Comparison of the pressure sore incidence rate: The Norton pressure sores risk assessment scale was used to compare the incidence rate of pressure sores at discharge between the two groups. Incidence of pressure sores (%) = (number of cases and)/total number of cases  $\times 100\%$ .

Comparison of length of hospital stay: obtained by consulting the hospital information system.

Comparison of differences in patients' satisfaction with nursing work: a self-made nursing satisfaction questionnaire of Qijing No. 1 Hospital (responsible nurse service quality-patient evaluation form) was used to evaluate nursing work satisfaction. In this study, the Cronbach's  $\alpha$

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**Table 1.** Comparison of basic conditions of stroke rehabilitation patients between the two groups ( $\bar{x} \pm sd$ )

| Item                  | Control group (n=47) | Experimental group (n=49) | t/ $\chi^2$ | P     |
|-----------------------|----------------------|---------------------------|-------------|-------|
| Age (years)           | 60.6±8.1             | 62.5±8.8                  | 1.083       | 0.281 |
| Sex                   |                      |                           | 0.333       | 0.564 |
| Male                  | 30 (63.82)           | 34 (69.38)                |             |       |
| Female                | 17 (36.17)           | 15 (30.61)                |             |       |
| Infarct location      |                      |                           | 0.132       | 0.717 |
| Anterior circulation  | 30 (63.82)           | 33 (66.17)                |             |       |
| Posterior circulation | 17 (36.17)           | 16 (33.24)                |             |       |
| Disease severity      |                      |                           | 0.155       | 0.925 |
| Mild                  | 15 (31.91)           | 14 (28.57)                |             |       |
| Moderate              | 27 (57.45)           | 29 (59.22)                |             |       |
| Severe                | 5 (10.64)            | 6 (12.24)                 |             |       |

**Table 2.** Comparison of muscle strength efficacy between the two groups (n)

|                           | Effective | Invalid | Effective rate (%) |
|---------------------------|-----------|---------|--------------------|
| Experimental group (n=49) | 42        | 7       | 85.7               |
| Control group (n=47)      | 26        | 21      | 55.3               |
| T                         |           |         | 10.728             |
| P                         |           |         | 0.001              |

patients were compared and analyzed, and it was found that there was no significant difference in the general situation of stroke rehabilitation patients between these two groups ( $P > 0.05$ ), as shown in **Table 1**.

*Comparison of muscle strength efficacy between the two groups*

coefficient of this scale was measured to be 0.91, the Spearman-Brown half reliability coefficient was 0.87, and the satisfaction (%) = (very satisfied number + satisfied number)/total number of cases  $\times 100\%$  [10].

### Statistical analysis

All study data were analyzed by SPSS 22.0 statistical software. Measurement data were normally distributed and expressed as mean  $\pm$  standard deviation ( $\bar{x} \pm sd$ ). Independent sample t-test was used for comparison between groups, and paired sample t-test was used for comparisons before and after in groups. Enumeration data were expressed as number of cases/percentage (n/%) and chi-square test was used.  $P < 0.05$  was considered to indicate a significant difference.

### Results

#### *Comparison of the basic situation of stroke rehabilitation patients between the two groups*

In order to ensure the reliability of this study, after obtaining the consent of stroke rehabilitation patients and their families, the relevant data and the self-data of stroke rehabilitation

The improvement of muscle strength at discharge was compared between the two groups. The results showed that the effective rate was 85.7% in the experimental group and 55.3% in the control group. The difference was statistically significant ( $P < 0.01$ ). The specific results were shown in **Table 2**.

#### *Barthel index score and Montreal Cognitive Assessment (MoCA) score in the two groups*

The comparison of Barthel index score at admission and discharge between the two groups showed that there was no significant difference in Barthel index score at admission, without statistical significance ( $t = 0.668$ ,  $P > 0.05$ ). The Barthel index score at discharge in the experimental group was higher than that in the control group, with statistical significance ( $t = 2.031$ ,  $P < 0.05$ ). The MoCA score of the experimental group before treatment was (25.67 $\pm$ 3.11) points and the MoCA score after treatment was (29.01 $\pm$ 2.21) points. The MoCA score of the control group before treatment was (24.11 $\pm$ 4.65) points and the MoCA score after treatment was (25.35 $\pm$ 2.29) points. After the implementation of the clinical nursing pathway in the experimental group, the improvement in cognitive function in patients was significantly higher

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**Table 3.** Barthel index score and MoCA score in the two groups (points,  $\bar{x} \pm sd$ )

| Group               | Experimental group (n=49) | Control group (n=47) | t     | P     |
|---------------------|---------------------------|----------------------|-------|-------|
| Barthel index score |                           |                      |       |       |
| Before treatment    | 56.12±15.75               | 54.23±11.55          | 0.668 | 0.506 |
| Post Treatment      | 66.22±18.81*              | 59.36±13.78*         | 2.031 | 0.045 |
| MoCA score          |                           |                      |       |       |
| Before treatment    | 25.67±3.11                | 24.11±4.65           | 1.939 | 0.555 |
| Post Treatment      | 29.01±2.21*               | 25.35±2.29*          | 7.969 | 0.000 |

Note: MoCA: Montreal Cognitive Assessment. Compared with that before intervention in the same group, \*P<0.05.

**Table 4.** Comparison of satisfaction with nursing work between the two groups (n, %)

| Group                     | Not Satisfied | General   | Satisfied | Z      | P     |
|---------------------------|---------------|-----------|-----------|--------|-------|
| Experimental group (n=49) | 5 (10.2)      | 18 (36.7) | 26 (53.1) | -2.056 | 0.040 |
| Control group (n=47)      | 6 (12.8)      | 27 (57.4) | 14 (29.8) |        |       |

**Table 5.** Comparison of incidence rate of pressure sores between the two groups (n, %)

| Group                     | No case | Number of subjects |
|---------------------------|---------|--------------------|
| Experimental group (n=49) | 48      | 1                  |
| Control group (n=47)      | 44      | 3                  |
| $\chi^2$                  |         | 1.133              |
| P                         |         | 0.287              |

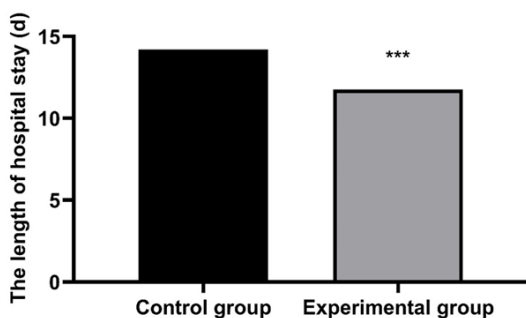
ence had statistical significance (P<0.05). The specific score results are shown in **Table 4**.

### *Comparison of the incidence of pressure sores between the two groups*

One case of pressure sores occurred in the experimental group, and 3 cases occurred in the control group,  $\chi^2=1.133$ , P=0.287, the difference was not statistically significant (P>0.05), the specific results are shown in **Table 5**.

### *Comparison of hospital stay between the two groups*

The comparison of hospital stay between the two groups showed that the hospital stay was (11.76±2.06) days in the experimental group and (14.21±2.40) days in the control group. Thus, the average hospital stay in the experimental group was less than that in the control group, and the difference had statistical significance (P<0.001). The specific results were shown in **Figure 1**.



**Figure 1.** Comparison of the length of hospital stay between the two groups. Compared with routine care group, \*\*\*P<0.001.

than that in the control group, and the difference was statistically significant (P<0.001). The specific results were shown in **Table 3**.

### *Comparison of satisfaction with nursing work between the two groups*

Through the investigation of nursing job satisfaction in the two groups, it was found that the satisfaction in the experimental group was better than that in the control group, and the differ-

## Discussion

At present, most of the treatment for stroke rehabilitation patients is follow-up, and the main content is health preaching by distributing publicity brochures [11]. However, the patients cannot receive timely help after having problems, and there is very little communication with the doctors, which is not conducive to the postoperative rehabilitation of stroke rehabilitation patients [12]. In the previous treatment process, since all information is actively pro-

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vided by stroke rehabilitation patients, some treatment guidance cannot be timely and accurately mastered, and untimely treatment often occurs, resulting in very unclear physical health of stroke rehabilitation patients [13, 14].

Barthel index score and MoCA score are widely used functional recovery assessment scales for stroke rehabilitation patients in clinical practice. This topic study evaluates the functional recovery of patients accordingly [15]. Studies have shown that whole-process full cycle rehabilitation management and treatment intervention for stroke rehabilitation patients can ensure that patients receive continuous, effective and scientific treatment after discharge, as well as help patients to master correct activities of daily living and cognitive function, and promote the rehabilitation of patients' function [16]. In this study, after treatment, the Barthel index score and MoCA score of the two groups were significantly improved compared with those before intervention, and the experimental group was significantly higher than the control group, which showed that whole-process full cycle rehabilitation management and treatment can improve the functions of stroke rehabilitation patients and promote the rapid recovery of patients.

Stroke rehabilitation patients still need a period of rehabilitation after discharge, but often due to limited hospital stay and poor rehabilitation exercise, patients have many dysfunctions for a long time, seriously affecting the quality of life of patients [17]. Scholars studied 29 patients with early severe stroke and assessed how regular early and intensive rehabilitation treatment was performed under strict monitoring of HDU. After 3 weeks of rehabilitation treatment, VAS score, Wada drinking water test, upper limb FMA, lower limb FMA and MBI were significantly recovered. This type of care can achieve a more ideal effect and is commonly known early rehabilitation intervention with good results in the treatment of complications, motor function and activities of daily living. It was reconfirmed that early, timely and reasonable intervention for critically ill patients was of great significance to improve the prognosis and shorten the course of disease [18]. Whole-process full cycle rehabilitation management and treatment can provide more comprehensive rehabilitation for patients, and has obtained good results in improving stroke rehabili-

tation patients to shorten the length of hospital stay, reduce the incidence of dysphagia, the incidence of pressure sores [19]. Combined with the indicators of this study, it can be seen that compared with the traditional rehabilitation models, the length of hospital stay and the incidence of pressure sores of patients under whole-process full cycle rehabilitation management and treatment are better.

The implementation of whole-process full cycle rehabilitation management and treatment for stroke rehabilitation patients and the arrangement of specialist nurses to regularly provide comprehensive and systematic guidance for patients can timely detect and deal with problems, with consult of nurses at the first time, to assist getting the corresponding help, and help patients master functional training, so as to improve patient treatment satisfaction [20, 21]. The results of this study showed that the patient satisfaction as well as the total score in the experimental group was significantly higher in the experimental group than those in the control group. However, since this study only investigated part of the recovery content, the scope involved is relatively small, thus, the application value of continuous care is still not deep enough, and further research will be made on it in future applications.

In summary, whole-process full cycle rehabilitation management and treatment improves patients' activities of daily living, improves patients' limb muscle strength, promotes the recovery of patients' cognitive function, shortens patients' hospital stay, and improves patients' satisfaction with treatment work.

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### Disclosure of conflict of interest

None.

**Address correspondence to:** Shaokun Lv, Department of Rehabilitation Medicine, Qujing No. 1 Hospital, No. 1 Yuanlin Road, Qilin District, Qujing 655000, Yunnan Province, China. Tel: +86-0874-6068855; E-mail: lvshaokun9h3w@163.com; Liqing Yao, Department of Rehabilitation Medicine, The Second Affiliated Hospital of Kunming Medical Uni-

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versity, No. 374 Dianmian Avenue, Kunming 650101, Yunnan Province, China. Tel: +86-0871-63402690; E-mail: yaoliqingnb12@163.com

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