EFFECT OF RAPID REHABILITATION SURGERY COMBINED WITH CONTINUOUS NURSING ON REHABILITATION OF PATIENTS WITH CEREBRAL HEMORRHAGE

LIANGYING LIANG, WEIFEI JIN, YADI MAO
Department of Neurosurgery, Shaoxing People’s Hospital, Shaoxing City 312000, China

ABSTRACT

Objective: To explore the impact of rapid rehabilitation surgery combined with continuous care on the rehabilitation of patients with cerebral hemorrhage.

Method: Sixty patients with cerebral hemorrhage who met the inclusion criteria in a neurosurgery of Shaoxing People’s Hospital from October 2016 to October 2017 are randomly divided into the experimental group (30 cases) and the control group (30 cases). The control group receives routine care and routine follow-up after discharge. On the basis of routine care, the experimental group is treated with rapid rehabilitation surgery and continuous care after discharge. The differences in hospitalization time, total hospitalization cost, and complication rate between the two groups are analyzed, and the upper and lower limb muscle strength, ADL score, NIHSS score, and FMA score at admission, discharge, and discharge after 3 months are recorded. Statistical analysis is performed with SPSS 17.0. Statistical methods included t test, chi-square test, and analysis of variance.

Results: The complication rate, hospitalization time and cost of the experimental group are lower than those of the control group, and the difference between the two groups is statistically significant (P<0.05); the upper limb muscle strength score of the experimental group is higher than that of the control group after 3 months of discharge. The difference between the two groups is statistically significant (P<0.01); the lower limb muscle strength scores of the experimental group are higher than those of the control group at the time of discharge and 3 months after discharge. The difference between the two groups is statistically significant (P<0.05); the ADL scores of the experimental group are higher than those of the control group at discharge and 3 months after discharge. The difference between the two groups is statistically significant (P<0.01); the NIHSS score of the experimental group is higher than that of the control group after 3 months of discharge. The difference between the two groups is statistically significant (P<0.05); the FMA scores of the experimental group are higher than those of the control group at discharge and 3 months after discharge. The difference between the two groups is statistically significant (P<0.05).

Conclusion: The application of rapid rehabilitation surgery combined with continuous care in patients with cerebral hemorrhage can greatly improve the rehabilitation effect of patients with cerebral hemorrhage.

Keywords: rapid rehabilitation surgery, continuous nursing, cerebral hemorrhage, rehabilitation.

DOI: 10.19193/0393-6384_2019_1s_84

Received October 30, 2018; Accepted February 20, 2019

Introduction

Cerebral hemorrhage, also known as cerebral hemorrhage, is a sudden onset with dangerous condition, and has a very high mortality rate. It is the most serious type of acute cerebrovascular disease, and it is also a fatal disease in middle-aged and elderly people(1). Its incidence is mainly related to the pathological and sclerosis of cerebrovascular(2). Vascular lesions are mainly associated with hyperlipidemia, diabetes, hypertension, vascular aging and smoking(3). In general, cerebral hemorrhage refers to spontaneous cerebral hemorrhage(4). Patients often have sudden onset due to emotional agitation, strenuousness, etc., manifested as aphasia, hemiplegia, and unclear consciousness(5). More than half of the patients are accompanied by headache and vomiting. The important cause of cerebral hemorrhage is hypertension, in which systolic blood pressure is particularly important(6). The incidence of cerebral hemorrhage will gradually increase with the increase of systolic blood pressure(7). When physical or mental activity is tense, blood pressure will rise further. When the pressure exceeds the ability of the blood vessel to withstand, the blood vessel will rupture and cer-
Cerebral hemorrhage occurs. Reports indicate that about 70%-80% of cerebral hemorrhage is caused by high blood pressure(8).

Rapid rehabilitation surgery has become the concept of promotion in Europe and the United States, especially in some European countries in recent years(9). Rapid rehabilitation surgery generally includes the following aspects: first, pre-operative patient education: detail the possible time of each stage of rehabilitation; various suggestions for promoting rehabilitation; recommendations and measures to encourage early oral feeding and getting out of bed(10). Second, better anesthesia, analgesia, and surgery can reduce surgical stress, pain, and discomfort(11). Third, strengthen postoperative rehabilitation, including early out of bed activities and early enteral nutrition(12). At present, the rapid rehabilitation program has been successfully applied to various diseases, including orthopedics, urology, gynecology and other operations(13). Most of the procedures have achieved good rehabilitation results, such as shortening the length of hospital stay, reducing the incidence of complications, and reducing the rate of rehospitalization(14).

Continuing care is part of holistic care, which is an extension of inpatient care, enabling discharged patients to receive ongoing health care during the recovery period, thereby promoting patient recovery and reducing the need for rehospitalization due to worsening conditions(15). There are 3 types of continuous care. First, the continuation of information: making current care suitable for everyone, based on patient information including past occurrences and personal circumstances(16); second, the continuation of management: responding to the changing needs of patients and implementing a continuous and consistent management approach to the health of patients(17); third, the continuation of the relationship: a sustainable therapeutic relationship between the patient and one or more health care providers(18). Continuing care does not emphasize the direct provision of long-term care for patients after discharge, but rather helps patients and their families improve their self-care ability(19). The guidance for patients is based on evidence, usually including drug guidance: drug name, adverse drug reactions, medication methods, and coordinated medications; provide personalized guidance based on the patient’s condition, eating habits, and ability to pay; symptom management and identification: identification and response to symptoms of exacerbation after discharge; use of assistive devices, rehabilitation training; use of community resources(20).

Studying rapid rehabilitation program combined with continuous care can protect and promote the role of organs, allowing patients to get out of bed at an early stage and maintain postoperative muscle function; early postoperative intake of nutrients can better preserve lean meat mass, reduce postoperative lung function damage, restore gastrointestinal motility earlier, increase activity and enhance cardiovascular function. Patient satisfaction has increased, and at the same time, treatment costs have decreased accordingly. Finally, the rehabilitation effect of patients with cerebral hemorrhage is improved.

Object and method

Research object

Research sample

60 patients with cerebral hemorrhage who met the inclusion criteria in a neurosurgery of Shaoxing People’s Hospital from October 2016 to October 2017 are included in the study. Patients are randomized into an experimental group and a control group, each consisting of 30 patients. All subjects in this study have signed informed consent and the study is approved by the XXX Hospital Ethics Committee.

Inclusion criteria

- The patient has spontaneous cerebral hemorrhage;
- The ADL score is below 90 points;
- The patient’s bleeding volume is 30ml - 50ml.

Exclusion criteria

- The patient has traumatic cerebral hemorrhage;
- The patient has cerebral palsy;
- The patient has a nervous system or other mental illness;
- The patient has other serious illnesses;
- The patient refused to cooperate with this study.

Research methods

Calculation formula

Referring to the Alvarezdiaz’s method, the sample content used in this experiment is calculat-
Effect of rapid rehabilitation surgery combined with continuous nursing on rehabilitation of patients with cerebral hemorrhage

According to the two-sided test, it is found that \( \alpha=0.05 \) and \( \beta=0.10 \), and thus \( t_{\alpha/2}=1.96 \), \( t_{\beta}=1.282 \). Further calculations are carried out according to the relevant research, and it is found that \( n_1=n_2=30 \). Therefore, the final sample size is determined to be 60 cases, including 30 in the experimental group and 30 in the control group.

**Research tools**

**ADL score sheet**

Activity of Daily Living (ADL) refers to the necessary activities that a person performs every day to meet the needs of daily life, including eating, dressing, washing, bathing, toileting, and dressing. Functional movements include turning over, sitting up from bed, shifting, walking, driving a wheelchair, going up and down stairs, and more. It can be achieved by Barthel index evaluation and functional independence measurement.

The Barthel Index can be used not only to assess functional status before and after treatment, but also to predict treatment outcomes, hospital stay, and prognosis. The Barthel index consists of 10 items, with a score of 0, 5, 10 and 15 in terms of whether they need help or not and the degree of help. The total score is 100. The higher the score, the stronger the independence and the smaller the dependence. Give 0 points if the patient can’t meet the criteria specified in the project. More than 60 points suggest that patients can basically take care of themselves, 60 to 40 points of patients need help, 40 to 20 points of patients need a lot of help, and patients under 20 points need full help.

Patients with a Barthel index of more than 40 have the greatest benefit from rehabilitation. Functional Independence Measurement (FIM) is more detailed, accurate, and sensitive than the Barthel index in reflecting the level of disability or the amount of help needed. It is a powerful indicator for analyzing and evaluating the efficacy of rehabilitation. FIM not only assesses ADL dysfunction due to motor impairment, but also assesses the impact of cognitive dysfunction on daily life.

FIM consists of six aspects, a total of 18, including 13 sports ADL and 5 cognitive ADL. The score is based on a 7-point scale, which is a maximum of 7 points for each item and a minimum of 1 point. The highest score for the total score is 126 points, the lowest score is 18 points. The level of scoring is based on the degree of patient independence, the need for assistive tools or ancillary equipment, and the amount of help given by others.

**NIHSS score**

The National Institute of Health stroke scale is easy to use and can be quickly mastered by nurses and doctors, with little fatigue and can be checked multiple times a day. There is no significant difference in the test-retest reliability between neurologists, researchers, and nurses. The content consistency is good. After a correlation study with CT results and a 3-month outcome, this table has good validity. Score by table and record the results. Do not change the score. The score reflects the actual situation of the patient, not what the doctor thinks the patient should be. Record the results while checking quickly. Do not train the patient unless necessary instructions (such as repeatedly asking the patient to do some kind of effort). If some items are not assessed, they should be detailed in the form. Unassessed items should be reviewed through surveillance video and discussed with the examiner.

**FMA score**

The higher the patient score, the better the rehabilitation effect of motor function. It is a quantitative evaluation method based on the combination of motor function, balance ability, pain and sensory function and joint activity after brain injury, and it has been widely used in clinical work.

**Research steps**

**Preparation in the early stage**

Pre-investigate the selected research objects, and then adjust the upcoming experiments based on the pre-survey data, and fully understand and grasp the contents of the score sheet to lay the foundation for the later experiments.

**Rapid rehabilitation surgery**

Rapid rehabilitation surgical measures are quite different from conventional care, as shown in the table below.
Table. 1: Comparison of nursing measures between experimental group and control group in perioperative period.

The first week: early passive movement. Passive exercise can also be performed when the patient’s consciousness is not clear, including flexion and extension of the joints such as the shoulders, elbows, wrists, knees, and ankles. The range of motion should not be too large, about three times a day. At the same time, the application of intermediate frequency electric therapy, electroacupuncture treatment and other methods can enhance the stimulation.

The second week: For patients with partial recovery function, they should be encouraged to use the healthy limbs to drive the affected side for basic life training, including body posture change training and Bobath technology. Constantly changing position can balance the flexor and extension of the limbs and prevent paralysis. Turn over and position change training can prevent pressure sores and lung infections. It is one of the most basic torso training. Generally, the body position is changed once every 60-120 minutes.

The third week: enhance life skills training such as wheelchair shifting, sitting balance training and ADL training. As the elderly and long-term bedridden patients are prone to orthostatic hypotension, rehabilitation procedures should be gradually established. The order is the correct position on the bed, sitting training, sitting balance training, standing balance training, and walking training.

The fourth week: further strengthen the patient’s mastery of standing training, walking training and other skills, encourage patients to be active in the ward, and family members accompany the patient to avoid accidents. Throughout the rehabilitation process, the patient’s psychological changes should be taken seriously, and psychological support for patients should be strengthened.

**Continuing care measures after discharge**

The first intervention time of this study is 3 days after discharge and is conducted by telephone follow-up. Telephone follow-up is performed weekly during the first month after discharge. After the second month and the third month after discharge, the patient is followed up every 2 weeks, and returned to the hospital for review in the third month after discharge.

The main content of continuous care in this study is health knowledge promotion, assessment of rehabilitation, supervision and implementation of medication orders, rehabilitation skills guidance and psychological support. Most patients with cerebral hemorrhage have high blood pressure, so blood pressure must be controlled to prevent recurrence of cerebral hemorrhage. At the same time, patients who are discharged from the hospital with a catheter should be guided by a professional nurse to maintain the pipeline for early prevention and detection of complications. According to the current data, analyze the various problems in the elderly patients with cerebral hemorrhage after surgery, propose targeted solutions, conduct predictive interventions, and evaluate the effect in time to take further intervention or improvement measures for unresolved or incompletely resolved problems.

**Evaluation method**

When the patient is admitted to the hospital, the muscle strength and GCS score are assessed. The patient’s nerve and motor function are assessed with a modified Barthel Index scale, the National Institutes of Health Stroke Scale, and a simplified Fugl-Meyer motor function score scale; when the patient is discharged from the hospital, the muscle strength is assessed. The patient’s nerve and mo-
tor function are assessed with a modified Pap index scale, the National Institutes of Health Stroke Scale, and a simplified Fugl-Meyer motor function score scale; when the patient is discharged for 3 months, the muscle strength is assessed. The neurological and motor function of the patient is assessed with a modified Barthel Index score scale, the National Institutes of Health Stroke Scale, and a simplified Fugl-Meyer motor function score scale.

**Statistical processing**
Statistical analysis is performed with SPSS 17.0. Statistical methods included t test, chi-square test, and analysis of variance. The count data is expressed in the form of frequency, and the measurement data is expressed in the form of mean and standard deviation. Where the test level \( \alpha = 0.05 \), all \( P \) values represent the two-sided probability.

**Results**

**Comparison of basic conditions**
As shown in Table 2, the experimental group included 23 male patients and 7 female patients. The average age is 60.10±7.79 years old. The GCS score is 9.10±0.72, and the mean bleeding volume is 38.20±5.22 ml. The control group included 21 male patients and 8 female patients. The mean age is 60.25±7.77 years old, the GCS score is 9.15±0.75, and the mean bleeding volume is 38.22±5.82 ml. There is no significant difference in the basic conditions between the two groups (\( P > 0.05 \)).

<table>
<thead>
<tr>
<th>Item</th>
<th>Test group (n=30)</th>
<th>Control group (n=29)</th>
<th>t/x</th>
<th>( \alpha )</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>23</td>
<td>21</td>
<td>0.114</td>
<td>0.736</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>60.10±7.79</td>
<td>60.25±7.77</td>
<td>0.055</td>
<td>0.956</td>
<td></td>
</tr>
<tr>
<td>GCS score</td>
<td>9.10±0.72</td>
<td>9.15±0.75</td>
<td>0.213</td>
<td>0.834</td>
<td></td>
</tr>
<tr>
<td>Amount of preoperative bleeding</td>
<td>38.20±5.22</td>
<td>38.22±5.82</td>
<td>0.013</td>
<td>0.989</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Comparison of basic conditions (\( \bar{x} \pm s \)).

**The comparison of upper limb muscle strength scores**
According to Figure 1, it can be concluded that the upper limb muscle strength scores of both groups are improved before and after treatment, and the difference is statistically significant (\( P < 0.05 \)). The upper limb muscle strength score of the experimental group is higher than that of the control group after 3 months of discharge, and the difference is statistically significant (\( P < 0.01 \)).

**The comparison of lower limb muscle strength scores**
From Figure 2, it can be concluded that the muscle strength scores of the lower limbs of both groups are improved before and after treatment, and there is statistical difference (\( P < 0.05 \)). The lower limb muscle strength scores of the experimental group at the time of discharge and 3 months after discharge are higher than those of the control group, and there is statistical difference (\( P < 0.05 \)).

**The comparison of ADL score**
From Figure 3, it can be concluded that the activity of daily living (ADL) of both groups of patients improved before and after treatment, and there is statistical difference (\( P < 0.05 \)). The ADL scores of the experimental group at the time of discharge and 3 months after discharge are higher than those of the control group (\( P < 0.05 \)), and there is statistical difference (\( P < 0.05 \)).
The comparison of NIHSS score

From Figure 4, it can be concluded that the NIHSS scores of both groups are reduced before and after treatment, and there is a statistical difference (P<0.05). The NIHSS in the experimental group is lower than the control group after 3 months of discharge, and there is a statistical difference (P<0.01).

The comparison of FMA score

From Figure 5, it can be concluded that the FMA scores of both groups are improved before and after treatment, and there is statistical difference (P<0.05). The FMA score of the experimental group is higher than that of the control group at the time of discharge and 3 months after discharge, and there is a statistical difference (P<0.05).

Discussion

Major findings of the study

Rapid rehabilitation surgical procedures after admission combined with continuous care after discharge helps to improve the muscle strength of patients with cerebral hemorrhage

The study shows that the upper limb muscle strength of the experimental group is 1.40±0.50 at the time of admission, and the upper limb muscle strength of the control group is 1.45±0.51, the difference is not statistically significant (P>0.05); at the time of discharge, the upper limb muscle strength of the experimental group is 2.40±0.50, and the upper limb muscle strength of the control group is 2.00±0.86, and the difference is not statistically significant (P>0.05). It may be caused by the following reasons: the central nervous system inhibits upper limb movement, and fine movement has higher requirements for muscle strength recovery; repeated, multi-frequency external stimuli can reconstruct the limb movement pattern, and the recovery effect in a short period of time will not be obvious. After 3 months of discharge, the upper limb muscle strength of the experimental group is 3.40±0.50, and the upper limb muscle strength of the control group is 2.55±0.69, the difference is statistically significant (P<0.01). It may be caused by the following reasons: rapid rehabilitation surgery during perioperative period, especially early rehabilitation treatment is conducive to future muscle strength recovery; the continuous nursing measures after discharge are beneficial to patients with positive effects on rehabilitation skills and health education.

Therefore, the rapid rehabilitation surgery after admission combined with continuous care after discharge helps to improve the muscle strength of patients with cerebral hemorrhage.
Rapid rehabilitation surgery combined with continuous nursing helps to improve ADL score in patients with cerebral hemorrhage

The study shows that the ADL score of the experimental group is 24.5±5.36 at admission, and the ADL score of the control group is 24.7±5.50, the difference is not statistically significant (P>0.05). At this time, the degree of ADL deficiency in both groups of patients is a serious functional defect, and it is necessary to rely on others to complete activities of daily living. At the time of discharge, the ADL score of the experimental group is 56.00±3.84, and the degree of ADL defect is moderate functional defect, which requires more help to complete daily activities; at the time of discharge, the ADL score of the control group is 44.01±5.61. The degree of ADL deficiency is a serious functional defect, and it is necessary to rely on others to complete activities of daily living. The difference in ADL scores between the two groups is statistically significant (P<0.01). After 3 months of discharge, the ADL score of the experimental group is 71.00±3.84, and the degree of ADL defect is mild functional defect, which requires less help to complete daily activities. After 3 months of discharge, the ADL score of the control group is 60.00±8.43, and the degree of ADL deficiency is moderately functionally deficient, requiring more help to complete activities of daily living. Therefore, the rapid rehabilitation surgical measures after admission combined with continuous care after discharge can help improve the ADL score of patients with cerebral hemorrhage.

Rapid rehabilitation surgery combined with continuous care helps to reduce NIHSS score in patients with cerebral hemorrhage

The study shows that the NIHSS score of the experimental group is 17.80±1.36 at admission and the NIHSS score of the control group is 17.80±1.23, the difference was not statistically significant (P>0.05). At the time of discharge, the NIHSS score of the experimental group is 14.05±1.76, and the NIHSS score of the control group is 15.10±1.80. The difference is not statistically significant (P>0.05). It may be caused by the following reasons: after cerebral hemorrhage, the mass effect causes primary damage, and the hematoma leads to secondary damage such as apoptosis, oxidative stress, free radical damage, etc. The body is in a state of stress for a long time, and its ability to remove harmful substances is limited; the com-

pensation and remodeling of nerve cells takes a certain amount of time, and the difference may not be obvious in the short term. After 3 months of discharge, the NIHSS score of the experimental group is 10.10±1.17, and the NIHSS score of the control group is 13.55±2.16, the difference is statistically significant (P<0.01). Therefore, rapid rehabilitation surgical procedures after admission, such as early rehabilitation combined with continuous care after discharge, can help reduce the NIHSS score in patients with cerebral hemorrhage.

Rapid rehabilitation surgery combined with continuous nursing helps to improve the FMA score of patients with cerebral hemorrhage

The study showed that the FMA score of the experimental group is 20.60±2.46 at admission and the FMA score of the control group is 20.40±2.50, the difference is not statistically significant (P>0.05). At the time of discharge, the FMA score of the experimental group is 43.60±5.99, and the FMA score of the control group is 36.30±6.30, and the difference is statistically significant (P<0.05). After 3 months of discharge, the FMA score of the experimental group is 62.80±8.64, and the FMA score of the control group is 50.10±7.10, the difference is statistically significant (P<0.01). Therefore, the rapid rehabilitation surgery after admission combined with continuous care after discharge helps to improve the FMA score of patients with cerebral hemorrhage.

Strengths and weaknesses of the research

The strengths of research
According to the actual situation of the research object, the experiment is designed reasonably. The effects of rapid rehabilitation surgery combined with continuous nursing on activities of daily living, nerve function and motor function of patients with cerebral hemorrhage are comprehensively analyzed. And based on the experimental results, reasonable suggestions are put forward. It combines the advantages of reasonable research methods and reasonable experimental arrangements in other scholars’ research.

The weaknesses of the research
Due to the time relationship, no long-term study is conducted. It is uncertain whether the rapid rehabilitation surgery combined with continuous nursing intervention still affects the daily liv-
ing ability, motor function and nerve function of patients with cerebral hemorrhage after 3 months of discharge. The length of study by other scholars is greater than the duration of the study, and the results may be more accurate. Overall, it is not much different from the results of this study.

**Significance and prospects of research**

**Research significance**

Based on a series of problems such as long course of disease, heavy burden of disease, decreased self-care ability and the characteristics of disease rehabilitation, the implementation of rapid rehabilitation surgery combined with continuous nursing can improve the quality of life of patients with cerebral hemorrhage and the burden of excessive medical expenses. Through rapid rehabilitation surgical care and continuous nursing intervention, it is conducive to the rehabilitation of patients with cerebral hemorrhage, reducing the burden of disease, improving the quality of life of patients, and preventing complications. It provides a theoretical and practical reference for the in-hospital and out-of-hospital care and rehabilitation of patients with cerebral hemorrhage, and it also points the way for clinicians to study nursing services. In the future, the mechanism of rapid rehabilitation surgery combined with continuous care will be considered on a large scale.

**The prospects of research**

The number of samples in this study is limited, and future research can increase the number of samples and minimize the impact of sample size on the results.

**Future research directions**

Because of the long-term illness of patients with cerebral hemorrhage, their daily life has been adversely affected. In recent years, psychological problems such as anxiety and depression after cerebral hemorrhage have received extensive attention. According to reports, about 40% of patients have psychological problems. Therefore, the inclusion of psychological problems in the content of services is one of the key research directions in the future.

**References**

10) Rahimzadeh P, Imani F, Faiz S H R, et al. The effects of injecting intra-articular platelet-rich plasma or prolotherapy on pain score and function in knee osteoarthri-


Corresponding Author:
YADI MAO
Department of Neurosurgery, No. 568 Zhongxing Road, Shaoxing People’s Hospital, Shaoxing City 312000, Zhejiang Province, China
Email: mgaamu@163.com (China)