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Oral nanoliposome in postoperative home care of patients with myelitis

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ABSTRACT

Acute myelitis (AM) mainly presents with paralysis, and sensory and autonomic dysfunction, which affects the daily life and quality of life (QoL) of patients. Reasonable selection of treatment and nursing can promote the recovery of patients. It was to explore the effect of oral nanoliposomes combined with home care on the rehabilitation of patients. A total of 100 AM patients who received surgical treatment were enrolled. According to the treatment and nursing methods, they were grouped into a control (oral administration of nanoliposomes plus routine nursing, n=50) and an observation group (oral administration of nanoliposomes plus home care, n=50). Differences between patients' neurological recovery, lower limb muscle strength, activities of daily living, QoL, and satisfaction with quality of care were assessed. As against control, the time of muscle strength to level 2, urination recovery time, walking time, and sensory recovery time was shorter, and the degree of lower limb muscle strength recovery was higher, the Barthel and Newcastle Satisfaction with Nursing Scale (NSNS) scores of daily living ability increased, and the QoL EuroQol-5 dimensions (EQ-5D) score decreased in the observation group ($P<0.05$). Oral administration of nanoliposome plus home care can promote the recovery of lower limb muscle strength, improve daily living ability and QoL, and improve nursing satisfaction in patients with AM surgery.

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Introduction

Acute myelitis (AM) is a neurological disease characterized by demyelinating lesions or necrosis of the white matter of the spinal cord caused by non-specific inflammation. The inflammatory reaction will cause the involvement of gray and white matter in multiple spinal segments and peripheral spinal cord membranes (1,2). However, there is no clear cause of AM, and it can occur in all age groups and is common in young adults. AM can cause motor and sensory dysfunction, limb paralysis below the lesion site, defecation and urination dysfunction, etc., which seriously affects the daily life and work of patients and reduces the quality of life (QoL) (3). In clinical practice, AM is treated with drugs, commonly used drugs include corticosteroids, but the therapeutic effect is not satisfactory, and long-term medication can induce all kinds of adverse reactions. Nanoliposomes are a new type of drug delivery carrier, and the preparation of drugs as nanoliposomes can better introduce some difficult-to-absorb macromolecular drugs into the systemic circulation (4,5). Different complications may occur in the long-term treatment of AM, and corresponding nursing intervention is of great significance for promoting the rehabilitation of patients. With the development of modern medical technology, the concept of home care has been gradually applied in clinical practice. The home care model emphasizes the patient-centered, highlights the role of family in the process of disease treatment and rehabilitation, pays attention to the physical and mental needs of patients and their families in the process of treatment, forms a patient-family-medical comprehensive cooperation model, and improves the quality of nursing service (6).

This article analyzed the effects of oral nanoliposomes combined with home care intervention on the activities of daily living, QoL, and nursing satisfaction of AM patients. It aimed to provide a reference for clinical treatment and nursing intervention of AM patients.

Materials and Methods

General information

100 AM patients treated in Enshi Tujia and Miao Autonomous Prefecture Central Hospital from March 2020 to March 2023 were enrolled. Inclusion criteria: AM was diagnosed by cerebrospinal fluid examination and MRI imaging; The muscle strength of bilateral lower limbs did not exceed grade 3; Different degrees of sensory plane disturbance and sphincter dysfunction were observed. All patients knew the experimental procedure and signed the informed consent. Exclusion criteria: consciousness and mental dysfunction; Peripheral and spinal cord injuries; Severe heart, liver and kidney dysfunction were observed. Combined with diabetes mellitus and other diseases

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requiring hormone treatment intervention. According to the treatment and nursing plan, 100 patients were divided into control and observation groups, with 50 cases in each group. There were 32 males and 18 females in control. The mean age was (37.90±5.11) years (range, 20-55). The disease duration was 24-43 days (32.16±2.83). There were 30 males and 20 females in the observation group. The average age was (39.13±4.79) years (range, 22-48). The disease duration ranged from 22 to 41 days (33.08±2.57). There was no significant difference in baseline data between the two groups ($P>0.05$).

Intervention methods

Patients in the control received routine nursing. According to the patient's condition during the perioperative period, the patients were instructed to accept nutrition-rich, light, and easily digestible fresh fruits and vegetables, drink more water and eat less food that is easy to produce gas. After the operation, oral anti-inflammatory nano-liposome drugs were used to observe the effect and adverse reactions after medication and to prevent complications. It should help patients to massage the abdomen regularly, train the patients to defecate and urinate regularly and tell the patients to clean the perineum and urethral orifice. It should help the patient turn over and massage the area under pressure.

Patients in the observation group were given home care based on the treatment and care of the control. Firstly, a family-style treatment environment was constructed. The ward environment was designed with warm colors, familiar objects were placed to reduce the strangeness of the environment, and bed sheets were changed regularly to maintain the cleanliness of the treatment environment. Secondly, it should strengthen the health education of the patient's family members, explain the occurrence, development, clinical characteristics, and treatment methods of the disease to the patient's family members patiently and in detail, and explain the examination results in the process of treatment. It needed to observe the development of the patient's condition and inform the patient's family members of the importance of postoperative rehabilitation training. In addition, relevant nursing training for family members was carried out, and the nursing ability of family members in the daily process was enhanced through observation videos, education manuals, special lectures, and other forms. It should help the patients to relieve their negative emotions, explain the treatment plan to the patients and their families in detail, encourage and support the patients, observe the patients' psychological and emotional lesions, and communicate in time to relieve the negative emotions of anxiety, tension, and fear. Finally, the patients were helped to carry out muscle strength, joint range of motion, sitting position, and other training, and the patients' shoulder, elbow, wrist, ankle, knee, and other joints were kneaded by professional medical and nursing staff (kneading the upper limbs for 5 minutes each time, and the lower limbs for 20 minutes each time, 2 times a day). The patient passively flexed and extended various joints of the limb, and simultaneously engaged in joint adduction and abduction activities, taking care not to cause muscle and ligament damage (20 each time, 3 times a day). The patient was instructed to perform body movement and turning-over training on the bed and to exercise the upper limbs and back muscles by lifting dumbbells. When the patient's muscle strength returned to level III, the patient was instructed to perform sitting balance training.

Observation indicators

Neurological function recovery effect: The time of muscle strength recovery to grade 2, the time of urination function recovery to normal condition, the time of walking on the ground, and the time of sensory recovery to normal condition were recorded.

Activities of daily living: The modified Barthel index assessment scale (7) was used to assess the ability of daily living of patients, including eating, bathing, grooming, dressing, stool and urine control, toileting, bed and chair movement, walking on the ground, going up and down stairs, and so on. The total score was 100 points, with a 5-level scoring method. The higher the score, the better the ability of daily living of patients.

Muscle strength of lower limbs: During the assessment, patients lay their lower limbs flat on the bed, and then different levels of muscle strength were defined according to the different conditions of the patients. Grade 0: no muscle contraction; Grade 1: slight muscle contraction but no movement in the lower limbs; Grade 2: muscle contraction of the lower limbs and the ability to translate, but unable to lift off the bed; Grade 3: muscle contraction of the lower limbs, and patients can lift off the bed surface, but can't resist resistance; Grade 4: lower limb muscle contraction, and patients can lift off the bed and resist partial resistance; Grade 5: normal muscle strength.

QoL: QoL was assessed by EuroQol-5 dimensions (EQ-5D) (8), which included mobility, self-care ability, daily activity ability, pain or discomfort, anxiety or depression, and other aspects. The QoL was assessed using a 3-point scale ranging from 5 to 15 points, with lower scores indicating higher QOL.

Nursing satisfaction: Newcastle Satisfaction with Nursing Scale (NSNS) (9) was adopted to evaluate patients' satisfaction with nursing quality, which included 19 test items, with the 5-level scoring method. The total score was 95 points, and the higher the score, the higher the patient's satisfaction with the quality of nursing.

Statistical methods

SPSS 19.0 statistical software was adopted for data analysis. Count data were expressed as frequency or percentage, and the chi-square test was adopted for comparison between groups. Measurement data conforming to normal distribution were expressed as mean ± standard deviation, and t-test was adopted for contrast between groups. When $P<0.05$, the difference was statistically significant.

Results

Evaluation of neurological function recovery in patients with myelitis

Neurological recovery in patients with myelitis after treatment was evaluated by time to muscle strength recovery to level 2, time to normal urination, time to ambulation, and time to normal sensation (Figure 1). In control, the time of muscle strength recovery to level 2 was (15.39±1.38) days, the time to normal urination was (15.17±1.17) days, the time to ambulation was (26.38±2.37) days, and the time to normal sensation was (16.07±1.40) days. In the observation group, the time of muscle strength recovery to level

2 was (11.24±1.42) days, the time to normal urination was (8.93±1.20) days, the time to ambulation and the time to normal sensation was (17.81±1.45) days, and (7.14±1.27) days, respectively. As against control, the recovery time of muscle strength level 2, urination recovery, walking, and feeling recovery in the observation group was shortened (P<0.05).

Evaluation of lower limb muscle strength in myelitis patients

In control, there were 0 (0.0%) of grade 0, 16 (32.0%) of grade 1, 25 (50.0%) of grade 2, 6 (12.0%) of grade 3, 2 (4.0%) of grade 4, and 1 (2.0%) of grade 5. In the observation group, there were 0 (0.0%) of grade 0, 1 (2.0%) of grade 1, 10 (20.0%) of grade 2, 16 (32.0%) of grade 3, 14 (28.0%) of grade 4, and 9 (18.0%) of grade 5 post-treatment. As against control, the proportion of patients with bilateral lower limb muscle strength rated as grade 1 and 2 decreased, and the proportion of patients rated as grade 3, 4, and 5 raised post-treatment in the observation group (P<0.05) (Figure 2).

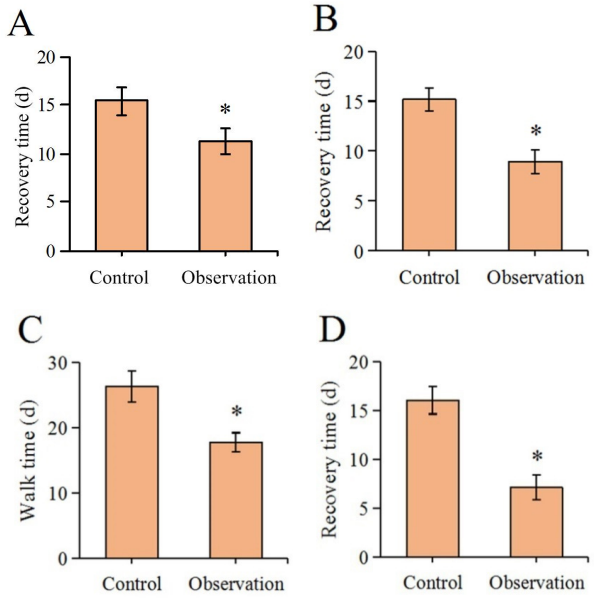

Figure 1. Contrast of effects of neurological function recovery. (A) time of muscle strength recovery of level 2; (B) time to normal urination; (C) walking time; (D) sensory recovery time; As against control, *P <0.05.

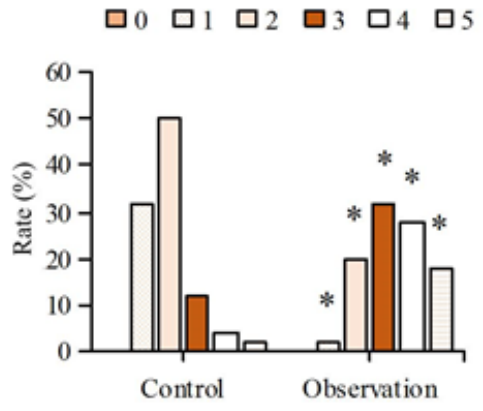

Figure 2. Contrast of bilateral lower limb muscle strength grading. Relative to control, *P<0.05.

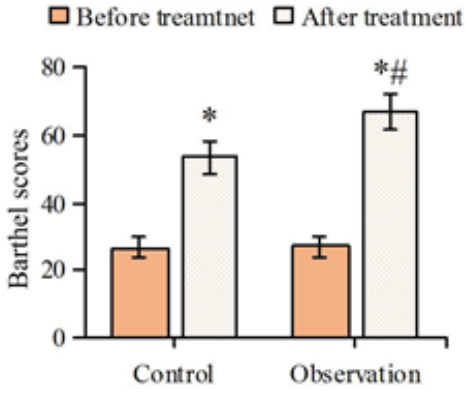

Figure 3. Contrast of Barthel scores. Relative to the same group pre-treatment, *P<0.05; Relative to control, #P<0.05.

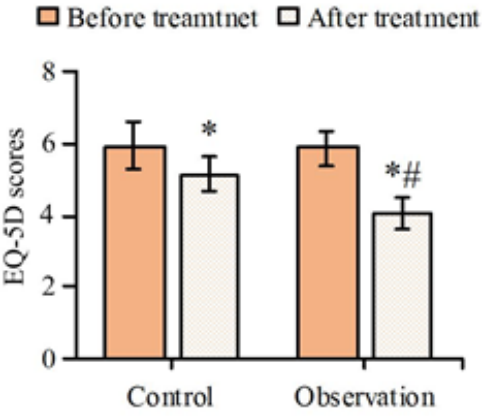

Figure 4. Contrast of EQ-5D scores. As against the same group pre-treatment, *P<0.05; As against control, #P<0.05.

The activity of daily living and QoL of myelitis patients

The Barthel score of the control was (26.88±2.74) before treatment and (53.49±4.71) following treatment; Those of the observation group were (27.04±2.85) and (66.78±5.27). Compared to before treatment, the Barthel scores of the two groups following treatment were increased (P<0.05). As against control, the Barthel score of the observation group increased following treatment (P<0.05) (Figure 3).

The EQ-5D score of the control was (5.93±0.65) before treatment and (5.14±0.50) after treatment. Those of the observation group were (5.89±0.48) and (4.03±0.44). Compared to before treatment, the EQ-5D scores of the two groups following treatment were decreased (P<0.05). As against the control, the EQ-5D score of the observation group decreased following treatment (P<0.05) (Figure 4).

Evaluation of myelitis patients' satisfaction with nursing quality

The NSNS score following treatment was (60.71±5.58) in control and (83.42±6.74) in the observation group. As against control, the NSNS score in the observation group increased post-treatment (P<0.05) (Figure 5).

Discussion

AM is an autoimmune disease with no familial or age-

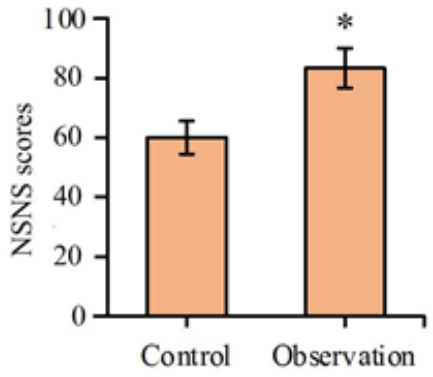

Figure 5. The contrast of NSNS scores. As against the control, *P<0.05.

specific differences. AM often causes the involvement of myelin sheath in the spinal cord, so there will be swelling, loss of myelin sheath, inflammatory infiltration, and other problems (10-12). At the time of onset, AM patients show low-grade fever, pain in the lesion site, limb numbness and weakness, band sensation in the lesion stage, and abnormal bladder and rectal sphincter function, but some patients experience sudden paralysis, or movement disorders and sensory loss (13). At present, the pathogenic cause of AM is not completely clear, and there is no specific drug for the treatment of AM. Dexamethasone is often used in the treatment of AM, but the recovery of neurological function after treatment is not obvious, and long-term use can cause serious adverse reactions (14,15). Because AM can lead to spinal cord swelling and neurological dysfunction, it is easy to cause paraplegia without timely treatment. Therefore, in addition to drug treatment, physical therapy and surgical treatment can also be used for the clinical treatment of AM (16). This article compares the effects of different nursing interventions on the rehabilitation of patients undergoing AM surgery.

The traditional nursing model pays more attention to the physiological care of patients, while the home care model attaches importance to the role of family in the process of hospitalization and discharge care (17). Patients undergoing surgical treatment will have different degrees of tension and anxiety during the perioperative period, and they will also be affected by the above negative emotions during the treatment and recovery process, which is not conducive to the rehabilitation of patients (18). The introduction of home care mode can alleviate the negative emotions of patients and their families, maintain a good physical and mental state, which is conducive to the smooth progress of surgery, reduce the pain caused by surgery, and accelerate the recovery process (19-21). This article found that the ability of daily living and QoL of AM patients were obviously improved after home care combined with oral administration of nanoliposomes. In addition, the muscle strength and nerve function of the lower limbs of the patients recovered more obviously. Based on traditional nursing, the home care mode formulates a scientific and reasonable functional exercise program according to the actual situation of patients, which can prevent muscle and ligament injuries (22). Positive psychological intervention can help patients and their families build confidence in rehabilitation, eliminate negative emotions, and improve patients' compliance with treatment and rehabilitation training (23). Muscle strength training and joint range of motion training can improve the circulation and limb function of patients, prevent the aggravation of the disease, and improve the QoL of patients (24). It was found that the satisfaction score of patients with nursing quality after home care intervention was significantly higher than that of routine care. Under the home care mode, it can deliver positive information to patients and their families, mobilize the enthusiasm of patients' family members through nursing training, and make patients feel the care and love of the family. Finally, it can obtain good nursing and treatment interventions, promote the rehabilitation process, and improve satisfaction with the quality of nursing.

Oral nanoliposome plus home care intervention for AM surgery patients can effectively promote the rehabilitation of neurological function and lower limb muscle strength of patients, improve the ability of daily living and QoL of patients, and improve the satisfaction of patients with the quality of nursing service. This article only evaluated the effects of different nursing models on the rehabilitation effect of AM surgery patients and did not explore the effects of factors such as medication mode and surgical methods. In the future, more sample sizes are needed to explore the important factors affecting the treatment effect of AM and to find the most suitable treatment and nursing plan. In conclusion, the home care model is worthy of clinical application.

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