Based on mNUTRIC score of nutrition support intervention in the application of the old patients with severe pneumonia effects, and the research on the influence of nutritional status

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Introduction. To explore the effect of nutritional support intervention based on modified Nutrition Risk in the Critically Ill (mNUTRIC) on the clinical treatment and nutritional status of elderly patients with severe pneumonia.

Methods. The study of 100 cases of elderly patients with severe pneumonia. The subjects were randomly divided into control group and experimental group, which received routine nursing intervention and routine nursing combined with nutritional support intervention respectively. The levels of immune factors, nutritional status and prognosis of the two groups were compared and analyzed.

Results. There was no significant difference in immune function and nutritional status between the two groups before treatment (P > 0.05). After treatment, the levels of immune factors, nutritional status and prognosis in the observation group were significantly better than those in the control group (P< 0.05).

Conclusions. Nutritional support based on mNUTRIC score is helpful to improve the immune function, nutritional status and prognosis of elderly patients with severe pneumonia.

Keywords. severe pneumonia; Nutritional support treatment; Nutritional status; Immune function; Prognosis

INTRODUCTION

The Critical Nutritional Risk Score is a nutritional risk assessment tool specifically designed for critically ill patients. Previous studies have shown that NUTRIC score performs well in nutritional risk assessment of critically ill patients. RAHMAN et al. further optimized NUTRIC score and obtained mNUTRIC score with fewer indicators and more convenient to use. Compared with NUTRIC score, mNUTRIC score requires fewer indicators and is easier to obtain. Severe pneumonia is a common pulmonary infection in the elderly, with respiratory tract damage and lung function decline. There are many clinical influencing factors for severe pneumonia in the elderly. Elderly patients with pneumonia may have problems such as long-term uncure, and the clinical mortality is relatively high. Elderly patients with severe pneumonia are prone to intestinal mucosal barrier dysfunction. The imbalance of intestinal flora in patients is prone to digestive problems and inflammatory reactions. In severe cases, it may even lead to the impairment of multiple organ functions, which is a high threat to the life safety of patients. The body of elderly patients with severe pneumonia is in a state of disease, the level of catabolism is increased, and the demand for nutrition is increased. However, patients are prone to impaired gastrointestinal function and hindered nutrition absorption. Therefore, it is necessary to assess the nutritional risk and provide nutritional support for elderly patients with severe pneumonia. A total of 90 elderly patients with severe pneumonia admitted to our hospital from April 2020 to September 2022 were selected as the research objects, and nutritional support was implemented based on mNUTRIC score to explore the effects of nutritional support intervention on their immune function, nutritional status and prognosis.

1 MATERIALS AND METHODS

1.1 Research Subjects

Ninety patients with severe pneumonia admitted to the Department of Critical Care Medicine of our hospital from April 2020 to September 2022 were selected as

the research objects of this study.

Inclusion criteria: patients aged ≥65 years old; The patient was diagnosed as severe pneumonia by clinical experts. There were no pulmonary diseases such as COPD. No malignant tumor; The patient had no immune system disease. The patients were unconscious and had good treatment compliance.

Exclusion criteria: patients with allergic reactions to enteral nutrition solution; The patient had other malignant diseases. Patients were complicated with mental disorders or excessive stress. The patient was too ill. Patients or their family members had poor treatment compliance and could not cooperate to complete the study. Patients dropped out of the study.

1.2 Clinical data

The clinical treatment of patients was collected, and the basic data included age, gender, and underlying diseases. Hemoglobin, albumin, prealbumin and other clinical indicators were collected after admission. Acute physiology and chronic health evaluation II was used to assess the severity of the disease. The average energy supply and protein supply of patients in the first 7 days after admission to ICU were recorded, and the energy and protein compliance rates on the 7th day after admission to ICU were recorded. The mortality, duration of mechanical ventilation, length of ICU stay and other prognostic indicators were recorded.

mNUTRIC score: The mNUTRIC score is mainly based on the nutritional assessment of patients. The main outcome measures included age, APACHEII score and length of hospital stay. ① Age was divided into three stages: < 50, 50-74, 75 or above, and the corresponding scores were 0, 1, and 2, respectively. ②APACHEII score: there were three stages: 15, 15-19, 20-27, ≥28, the corresponding scores were 0, 1, 2 and 3, respectively. ③SOFA score: the corresponding scores of < 6, 6-9 and ≥10 were 0, 1 and 2, respectively. ④ The number of comorbidities ≤1 was set as 0, and ≥2 was set as 1. ⑤ The length of stay before ICU admission: 1 day and ≥1 day corresponding scores were 0 and 1, respectively. The maximum mNUTRIC score is 9, with a score ≥5 indicating high nutritional risk.

1.2 Methods

After admission, the patients in the two groups needed symptomatic treatment according to their conditions, and a series of treatments such as anti-infection, anti-shock, and respiratory support were given to the patients.

The patients in the control group were given routine treatment, and the clinicians evaluated the patients' condition and treated them according to their clinical symptoms and clinical indicators. The patients were given parenteral nutrition for nutritional support intervention. Nutrition solution was dispensed according to the specific condition of patients, and intravenous infusion was used for nutritional support intervention.

Patients in the experimental group received enteral nutrition support intervention. mNUTRIC score was used to assess the nutritional status of patients to determine the degree of nutritional risk of patients. According to the mNUTRIC score combined with the clinical manifestations of patients and the nursing experience of clinicians, the nutritional support intervention plan was formulated. The nutritional needs of patients were mainly assessed using ASPEN/SCCM guidelines. The energy and protein supply of severe patients should be 25-30 kcal/(kg·d) and 1.2-2.0g/(kg·d). The actual situation of patients should be considered when nutritional support intervention is carried out. The calorie target and protein target intake of nutritional support intervention for patients with severe pneumonia were set as 30kcal/(kg·d) and 2.0g/(kg·d). According to the patient's mNUTRIC score and the patient's absorption situation, it is necessary to adjust the patient's nutritional support intervention plan in time, and provide patients with sufficient nutritional supply as much as possible without increasing the patient's digestive burden, so as to provide good basic conditions for the patient's disease recovery and promote the patient's recovery. The main methods of nutritional support intervention in the observation group were to assess the nutritional risk of patients in time after hospitalization and formulate a nutritional intervention support plan. Enteral nutrition solution was allocated according to the patient's condition and score. The nutrient solution should contain the

necessary nutrients. Enteral nutrition requires the use of a nasogastric tube. The patient's mouth and nose should be cleaned before infusion to reduce the risk of infection. The dose of nutrition infusion should be started from 20-30ml/h, and the infusion speed should be gradually increased according to the patient's tolerance. The maximum rate of enteral nutrition infusion should not exceed 100ml/h. The initial infusion of enteral nutrition solution was 500mL, and it was gradually increased according to the patient's condition. During the intervention of enteral nutrition support for patients, clinical nurses should pay attention to the patient's condition, do a good job of cleaning, adhere to the aseptic operation, and avoid the contamination of the nutrient solution leading to infection in the process of nutritional support intervention. Enteral nutrition solution should be kept in a certain temperature range (38℃-40℃) according to the environment and the patient's condition, so as to avoid too high or low temperature of enteral nutrition solution to stimulate the patient's gastrointestinal tract. 1.5g/(kg·d),

1.3 Indicators of observation

(1) The immune function and nutritional status of patients were evaluated before and after treatment. The level of immune function is mainly to monitor the level of CD4+, CD8+, CD4+/CD8+ of patients. The nutritional status was mainly to monitor the patient's hemoglobin, prealbumin, and albumin. The fasting venous blood of the patients was collected and detected by merry ella Vidas series automatic fluorescence immunoassay analyzer.

(2) The prognosis of the two groups was recorded, evaluated and compared. The prognostic indicators mainly included the duration of mechanical ventilation.

1.4 Statistical methods

SPSS21.0 was used for analysis. Measurement data were expressed as mean ± standard deviation (±s), t test, count data were expressed as mean ± standard deviation (%), $P<0.05$. Indicates that the difference is statistically significant;

2 RESULTS

2．1 The indexes of cellular immune function before and after treatment were compared between the two groups

Before treatment, there was no significant difference in CD4+ and CD4+/CD8+ between the two groups (P > 0.05). After treatment, the indexes of CD4+ and CD4+/CD8+ were significantly improved (P < 0.05). See Table 1.

Table 1 Comparison of cellular immune function indexes between the two groups before and after treatment

Groups	CD4+(%)		CD4+/CD8+	
	Before treatment	After treatment	Before treatment	After treatment
Control group	29.76±7.73	39.96±12.37	1.11±0.23	1.65±0.26
Research Group	29.80±7.65	50.43±10.79	1.12±0.19	2.98±0.37

2.2 The nutritional status indexes of the two groups before and after treatment were compared

Before treatment, there was no significant difference in HGB, PAB and ALB between the two groups (P > 0.05). After treatment, the levels of HGB, PAB and ALB in the observation group increased more significantly (P < 0.05). See Table 2.

Table 2 Comparison of nutritional status indicators between the two groups before and after treatment

Groups	HGB		PAB		ALB	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Control group	98.14±6.57	106.59±4.25	175.37±9.68	215.24±7.63	32.89±3.27	39.83±2.76
Research Group	97.93±6.86	99.97±4.84	176.21±10.05	188.75±8.42	33.05±3.34	35.78±3.12

2.3 The prognosis of the two groups after treatment was compared

After treatment, the mechanical ventilation time in the observation group was shorter than that in the control group ($P < 0.05$). See Table 3.

Table 3 Comparison of prognosis after treatment between the two groups

Groups	n	Duration of mechanical ventilation (d)
Control group	45	10.83±2.16
Research Group	45	7.15±1.42

3 DISCUSSION

mNUTRIC score is mainly a nutritional risk assessment tool for clinical critically ill patients. Nutritional risk refers to the risk that a patient's nutritional status has a negative impact on clinical treatment and prognosis. Critically ill patients have increased nutritional needs. Not adjusting the nutritional support intervention strategy in time is likely to lead to poor nutritional status of patients, which has a negative impact on the subsequent recovery of patients. mNUTRIC score is a commonly used clinical assessment tool to assess the nutritional status of patients. Compared with traditional nutritional assessment tools, the mNUTRIC score requires fewer clinical indicators and is more convenient to use. The mNUTRIC score can be used to assess the nutritional risk of patients from both acute and chronic aspects, which is conducive to individualized nutritional support and nursing according to the specific conditions of patients.

Malnutrition is a common problem in the clinical treatment of elderly patients with severe pneumonia. The level of catabolism in elderly patients with severe pneumonia increases after illness, and the demand for nutrients increases. However, elderly patients with severe pneumonia are prone to gastrointestinal dysfunction and decreased nutrient absorption ability during treatment. Therefore, elderly patients with severe pneumonia are prone to malnutrition in clinical treatment. Malnutrition will cause patients to be unable to obtain adequate nutrition during recovery, and the

recovery of lung function of patients will be negatively affected, which will easily lead to slow recovery or aggravation of the disease. The immunity of elderly patients with severe pneumonia decreases, the risk of infection increases, and the body is in a state of long-term stress. Stress can lead to the increase of adrenal hormones and other factors in patients, and the increase of protein metabolism in patients. Respiratory tract infection can lead to increased levels of inflammatory factors and energy consumption in elderly patients with severe pneumonia. In addition, in clinical treatment, patients may also use mechanical ventilation or non-invasive ventilation to promote disease remission. In the treatment of middle-aged and elderly patients with severe pneumonia, it is very likely to have problems such as ventilator dependence. Problems such as ventilator dependence may have a negative impact on the respiratory muscles and lung function of patients, which further leads to the decline of respiratory function, lung function and immune level of patients. The aggravation of the disease will affect the patient's physiology and psychology, which may increase the risk of complications or lead to negative emotions such as depression.

In recent years, more and more attention has been paid to the nutritional status of elderly patients with severe pneumonia in clinical treatment. How to improve the accuracy and feasibility of nutritional assessment has become one of the key issues in the clinical treatment of severe pneumonia. There are some differences in the severity of the disease, gastrointestinal function and other factors in elderly patients with severe pneumonia. How to choose the appropriate nutritional support intervention is an important issue in clinical nursing of elderly patients with severe pneumonia. Nutritional support intervention can provide adequate nutrition for patients, promote patients to maintain a good nutritional status, and provide good basic conditions for patients to disappear. The improvement of nutritional status can promote the immune level of patients and improve the problem of malnutrition in elderly patients.

Nutritional support interventions in clinical treatment are generally divided into parenteral nutrition and enteral nutrition. Parenteral nutrition is mainly the intravenous infusion of nutrient solution for nutritional support. The long-term use of

parenteral nutrition support may lead to gastrointestinal mucosal atrophy and other problems, which is not conducive to the long-term prognosis of patients. The effect of parenteral nutrition on nutritional status of patients is relatively small, and the improvement of nutritional status of patients may not be ideal. Enteral nutrition mainly involves the infusion of nutrient solution into the intestinal tract through a teahouse. The absorption efficiency of enteral nutrition is relatively high, and it can avoid intestinal mucosal atrophy and promote the recovery of intestinal function in patients. Enteral nutrition support is often used as a nutritional support intervention for critically ill patients in clinical treatment. Gastrointestinal tract is an important digestive organ of human body, and it also has an important impact on human immunity. Nutritional support intervention can adjust the nutritional support measures according to the situation of patients, and better meet the nutritional needs of patients. Severe pneumonia has a great impact on elderly patients, and patients are likely to have problems such as long treatment time due to malnutrition. Elderly patients with severe pneumonia generally have problems such as poor nutritional status and decreased gastrointestinal function. During the clinical treatment of elderly patients with severe pneumonia, we should pay close attention to the nutritional status of patients, monitor and evaluate the nutritional status of patients, and provide timely nutritional support intervention to avoid malnutrition and other problems.

The outcome indicators selected in this study were mainly the level of immune factors, nutritional status, and prognosis of patients. In terms of immune factor levels, there were significant changes in immune factor levels before and after treatment. Patients showed increased CD4+ levels and CD4+/CD8+ ratio after treatment. CD4+ is an important immune marker in patients and an important indicator to measure the immune level in patients. The increase of CD4+ level indicates the increase of immune capacity in the patient. CD8+ is a cytokine that activates inflammatory response in cells. The increase of CD4+/CD8+ ratio after treatment indicates that CD8+ secretion in patients has been inhibited to a certain extent, indicating that the patient's immune function has been significantly improved after treatment. By

comparing the clinical treatment effect of the two groups of elderly patients with severe pneumonia, it can be seen that after treatment, the CD4+ and CD4+/CD8+ of the observation group were higher, indicating that nutritional support intervention nursing helps elderly patients with severe pneumonia to restore immune function. Nutritional support intervention nursing is mainly based on the clinical manifestations and clinical indicators of patients combined with mNUTRIC score to carry out personalized nutritional intervention nursing for elderly patients with severe pneumonia. During the treatment of the disease, the basic nutritional status of patients is different, and the severity of the disease is different, so the specific nutritional supply is also different. The use of mNUTRIC score combined with nutritional support intervention nursing can better meet the nutritional needs of patients, avoid insufficient nutritional supply of patients, and affect the recovery of patients. From the immune function levels of the two groups of patients after treatment in this study, it can be seen that nutritional intervention nursing has a significant promoting effect on the recovery of patients. The results of this study showed that the nutritional status of patients receiving nutritional support nursing was significantly improved after treatment, and the improvement was more obvious than that of the control group, which also indicated that nutritional support intervention was helpful to the improvement of nutritional status and the recovery of immune function of patients. From the perspective of prognosis, patients who used nutritional support intervention had a higher prognosis level.

In summary, the use of mNUTRIC score combined with nutritional support intervention nursing can better meet the nutritional needs of patients, enhance the immune function of patients, and improve the prognosis, which is worthy of promotion and application.

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