

Exploration on the Effects of Individualized Nutritional Nursing and Behavior Intervention on the Nutritional Status, Immune Function, and Cancer-related Fatigue of Patients with Esophageal Cancer Radiotherapy

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Abstract

Objective: Explore and discuss the application value of individualized nutritional care and behavioral intervention for patients with esophageal cancer radiotherapy. **Methods:** A total of 64 patients with esophageal cancer radiotherapy in our hospital from January 2020 to December 2020 were selected. According to the time of admission, they were divided into the study group (n=32) and the control group (n=32). The control group adopts conventional nursing, and the study group adopts individualized nutrition nursing and behavior intervention on the basis of the control group. Then, compare the nutritional status scores of the two groups [serum albumin (ALB), transferrin (TRF) levels], immune function [natural killer cells (NK), T lymphocyte subsets (CD4+)], and Piper Fatigue Score (PFS) for cancer-related fatigue. **Results:** After 40Gy and 56Gy of radiotherapy, the levels of ALB and TRF in the study group were higher than those in the control group ($P<0.05$); After the intervention, the levels of NK and CD4+ in the study group were higher than those in the control group ($P<0.05$), while the PFS score of the study group was lower than that of the control group ($P<0.05$). **Conclusion:** The application of individualized nutritional care and behavioral intervention to patients with esophageal cancer radiotherapy can improve nutritional status, enhance immune function, and reduce cancer-related fatigue.

Keywords

Esophageal cancer; Radiotherapy; Individualized nutritional care; Behavior intervention; Nutritional status; Cancer-related fatigue.

1. INTRODUCTION

With the changes in modern social structure and eating habits, the incidence of esophageal cancer is also increasing. The age of onset is often more than 40 years old, and there are more males than females [1]. The pathogenesis of esophageal cancer is complex, such as tobacco, alcohol, and nitrosamines. The symptoms of the disease are not obvious in the early stage, and in the middle and late stages, patients are progressive dysphagia, thin, and dehydrated, which reduces the quality of life of patients [2-3]. Radiotherapy for esophageal cancer has become a common treatment for the early stage of the disease. Reasonable and effective nursing intervention can improve the treatment effect of patients, and individualized nutrition nursing and behavior intervention can significantly improve the nutritional status of patients, improve the physical fitness of patients, and enhance the treatment effect. This study selected 64 patients with esophageal cancer radiotherapy in our hospital and explored the application value of individualized nutritional care and behavioral intervention. The report is as follows.

2. MATERIALS AND METHODS

2.1. General Materials

In this study, 64 patients with esophageal cancer radiotherapy in our hospital from January 2020 to December 2020 were selected and divided into the study group (n=32) and the control group (n=32) according to the time of admission. Control group: 18 males and 14 females; age from 47 to 75 years old, the average age of (54.25±4.12) years; location of lesions: 9 cases of upper thoracic segments, 11 cases of middle thoracic segments, and 12 cases of lower thoracic segments. Study group: 16 males and 16 females; age from 48 to 76 years, average age (54.32±4.14) years; location of lesions: 10 cases of upper thoracic segments, 10 cases of middle thoracic segments, and 12 cases of lower thoracic segments. The baseline data of the two groups are balanced and comparable (P>0.05).

2.2. Selection Standard

(1) Inclusion: a) The diagnosis of esophageal cancer was confirmed by fiber esophagoscopy and barium swallow X-ray film; b) Radiotherapy tolerance; c) Those who have failed conservative treatment and meet the indications for radiotherapy; d) Patients without previous history of esophageal cancer.

(2) Exclusion: a) Patients with a history of radiotherapy and chemotherapy; b) Patients with blood diseases; c) Patients with severe heart, liver, and kidney abnormalities.

2.3. Methods

2.3.1 Control group

Use routine care. Communicate with patients, defuse their negative emotions, encourage and support patient treatment, guide patients to exercise routinely, and provide patients with basic dietary care. The diet is mainly light and avoids spicy or greasy. The environment of the ward should be comfortable, tidy, and light-soft, and the patient should be given rehabilitation guidance.

2.3.2 Study group

Adopt individualized nutritional care and behavioral intervention.

(1) Individualized nutritional care: a) Statistics of patients' dietary habits, body mass index, nutritional status, medical history data, disease progression, and other basic information; Formulate targeted and individualized patient nutrition plans, including healthy recipes, meal intake, meal times, etc.; Record the patient's meals in a timely manner, nutrition status; And adjust the plan in time; b) During the period of radiotherapy for esophageal cancer, calculate the total calories that the patient should consume per day and adjust the dietary structure. The diet is based on high-protein foods such as meat, eggs, and milk; Eat more foods with high iron content such as spinach and animal organs; And increase the intake of nutrient powder during the three meals. If it is not possible to eat normally, prepare a liquid diet according to the structure of nutrition and enter it into the body through enteral nutrition support; c) Patients eat small and frequent meals, and the number of meals per day is ≥5 times; 500ml of water should be supplemented before meals; 1000ml of drinking water should be supplemented between two meals, and the patient's daily drinking water should be ≥3000ml.

(2) Psychological intervention: a) Psychological guidance: medical staff actively communicate with patients, listen to and understand patients, pay close attention to the emotional state of patients, and can use soothing music, gossip, etc. to divert their attention; b) Improve confidence in treatment: Provide health education to patients and their families, talk about disease-related knowledge, radiotherapy knowledge, etc., patiently and in detail answer patients' doubts, and eliminate each other's worries, fears, and feelings of anxiety; c) Enhance

social support: Encourage patients' family members to encourage, support, and accompany the patients more, and ease the patients' negative emotions.

(3) Cognitive intervention: a) After admission, guide the patient to talk about their inner thoughts, concerns, awareness of the disease, and awareness of recovery after treatment. Nursing staffs conduct corrective interventions, comprehensively explain relevant knowledge about radiotherapy for esophageal cancer, and answer patients' doubts; b) Hold an expert forum and distribute health education manuals to all patients; make a blackboard report of esophageal cancer to strengthen patients' awareness of esophageal cancer radiotherapy and understand precautions.

(4) Sports intervention: According to the patient's gender, weight, actual condition, etc., develop a targeted and reasonable scientific exercise intervention plan. The main exercise is aerobic exercise, such as Tai Chi, yoga, slow walking, etc., for 2 times/day, 30min/time. Control the amount of exercise of the patient to avoid excessive fatigue. Instruct patients to perform relaxation training and breathing training to relax the body and mind 2 times a day, 15min/time.

(5) Sleep intervention: Nursing staff guide patients to form a healthy schedule and help patients implement a reasonable schedule. Before going to bed every night, eat hot milk, chrysanthemum tea, bananas, and other foods that help sleep. Avoid strong tea and coffee. Family members can massage the patient's scalp to soothe the patient's body and mind.

The interventions of both groups are 2W.

2.4. Observation Index

(1) Nutritional status: Record and compare the serum albumin (ALB) and transferrin (TRF) levels of the two groups before and after the intervention.

(2) Immune function: Record and compare the natural killer cells (NK) and T lymphocyte subsets (CD4+) of patients before and after the intervention between the two groups.

(3) The Piper Fatigue Score (PFS) is used to evaluate the degree of cancer-related fatigue. The total score is 0-10 points. The higher the score, the more severe the degree of cancer-related fatigue.

2.5. The Statistical Method

SPSS22.0 is used for analysis, and measurement data is expressed by ($\pm s$). In the t-test, the count data is represented by n (%); in the χ^2 test, the test level is $\alpha=0.05$.

3. RESULTS

3.1. Nutritional Status

Before the intervention, there was no significant difference in the levels of ALB and TRF between the two groups ($P>0.05$). After 40Gy and 56Gy of radiotherapy, the levels of ALB and TRF of the experimental group were higher than those of the control group ($P<0.05$). More details can be seen in Table 1.

Table 1. Nutritional status ($\bar{x} \pm s$, g/L)

Groups	Case Number	ALB			TRF		
		Before Intervention	Radiotherapy 40Gy	Radiotherapy 56Gy	Before Intervention	Radiotherapy 40Gy	Radiotherapy 56Gy
Study Group	32	34.56 $\pm$ 2.51	33.38 $\pm$ 2.45	34.78 $\pm$ 2.63	2.04 $\pm$ 0.10	1.92 $\pm$ 0.08	2.23 $\pm$ 0.12
Control Group	32	34.39 $\pm$ 2.48	29.39 $\pm$ 2.18	28.92 $\pm$ 2.12	2.02 $\pm$ 0.08	1.76 $\pm$ 0.07	1.76 $\pm$ 0.09
t		0.273	6.883	9.813	0.884	8.514	17.725
P		0.786	<0.001	<0.001	0.380	<0.001	<0.001

3.2. Immune Function

Before the intervention, there was no significant difference in the levels of NK and CD4+ between the two groups ($P>0.05$). After the intervention, the levels of NK and CD4+ in the experimental group were higher than those in the control group ($P<0.05$). See Table 2 for details.

Table 2. Immune function ($\bar{x} \pm s$, %)

Groups	Case Number	NK		CD4+	
		Before Intervention	After Intervention	Before Intervention	After Intervention
Study Group	32	9.10 $\pm$ 0.87	13.54 $\pm$ 1.02	37.87 $\pm$ 2.54	43.15 $\pm$ 3.57
Control Group	32	8.95 $\pm$ 0.84	11.25 $\pm$ 1.01	37.54 $\pm$ 2.52	37.58 $\pm$ 3.01
t		0.702	9.025	0.522	6.748
P		0.486	<0.001	0.604	<0.001

3.3. PFS Scores

Before the intervention, the PFS scores of the two groups were not significantly different ($P>0.05$). After the intervention, the PFS score of the experimental group was lower than that of the control group ($P<0.05$). See Table 3 for details.

Table 3. PFS scores ($\bar{x} \pm s$, scores)

Groups	Case Number	Before Intervention	After Intervention
Study Group	32	8.25 $\pm$ 0.65	1.35 $\pm$ 0.12
Control Group	32	8.23 $\pm$ 0.63	4.02 $\pm$ 0.25
χ^2		0.125	54.466
P		0.901	<0.001

4. DISCUSSION

Esophageal cancer is a common clinical gastrointestinal tumor disease with a high fatality rate and multiple pathogenesises. Patients often have symptoms of swallowing discomfort, and delays in treatment threaten the lives of patients [4-5]. Radiotherapy for esophageal cancer has a wide range of clinical indications, but it can easily cause gastrointestinal mucosal irritation, block the excretion of toxins, trigger toxic and side effects, and easily reduce the nutritional status of the body and the tolerance of radiotherapy [6-9].

Through reasonable and efficient nursing intervention and interventional treatment, the occurrence of adverse events in radiotherapy can be reduced. Individualized nutritional care and behavior intervention pay attention to the nutritional intake of patients, correct and improve patient cognition, and carry out related behavior interventions to ensure the normal pathological and physiological needs of patients and to avoid patients with malnutrition [10]. In this study, individualized nutritional care and behavioral interventions were adopted for patients undergoing radiotherapy for esophageal cancer. The results of the study showed that after 40Gy and 56Gy of radiotherapy, the levels of ALB and TRF in the study group were higher than those in the control group ($P<0.05$), and the levels of NK and CD4+ in the study group were higher than those in the control group after intervention ($P<0.05$), which indicates the use of individualization nutritional care and behavioral intervention can improve the nutritional status and the immune function of the body. The reason is that individualized nutrition care and behavior intervention formulate an individualized nutrition plan according to the evaluation of

the actual situation of the patient. By adjusting a reasonable diet structure, following the principles of light and healthy food, balanced nutrition, eating small and frequent meals, and supplementing sufficient water and liquid food according to the principle of dietary balance, the nutritional status of patients can be improved, and the body's immunity can be strengthened. At the same time, exercise intervention is conducted. According to the actual situation of the patient, formulate a scientific exercise plan, strictly control the amount of exercise of the patient, avoid excessive fatigue, and guide the patient to perform relaxation and breathing training to enhance the body's immune function. The results of this study also showed that after the intervention, the PFS score of the study group was lower than that of the control group ($P < 0.05$), which means that the use of individualized nutritional care and behavioral intervention can reduce the degree of cancer-related fatigue. The reason is that individualized nutritional care and behavioral intervention can improve the patient's self-management ability through cognitive intervention for patients' disease, radiotherapy, post-treatment rehabilitation, etc., which is beneficial to treatment and reduces the degree of cancer-related fatigue; Through psychological intervention, enhance social support and psychological counseling, improve treatment confidence, etc., and reduce fatigue; Exercise intervention, that is, the patient performs the aerobic exercise, slow walking, etc., and sleep intervention, that is, maintain a healthy work and rest time, massage the scalp, soothe the body and mind, etc., and reduce fatigue.

In summary, the use of individualized nutritional care and behavioral intervention in patients with esophageal cancer radiotherapy can improve nutritional status, enhance immune function, and reduce cancer-related fatigue.

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