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Adverse Effects and Intervention of Frailty on Elderly Cancer Patients

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Abstract: *Purpose:* To study the adverse effects of frailty on elderly cancer patients and explore effective interventions. *Methods:* The convenience sampling method was used to select 362 elderly cancer patients who were consecutively admitted to the Oncology Department of the Affiliated Hospital of Hebei University from April 2020 to March 2021. The patients had five physical dimensions of activity tested and were divided into a frail group (n = 128) and a non-frail group (n = 234) based on the test results. The Chinese version of the Vulnerable Elders Questionnaire was formed on the basis of the Vulnerable Elders Survey-13 (VES-13). The two groups of patients were surveyed within three days of admission. The questionnaire includes general information (age, gender, education level, marital status, monthly income, living area, smoking, and alcohol history, hearing, vision, and sleep status), Geriatric Depression Scale (GDS), Mini Nutritional Assessment (MNA), Mini-Mental State Examination (MMSE), and Charlson Comorbidity Index (CCI). *Results:* (1) By comparing the general information of the two groups of patients, it was found that the gender, education level, marital status, living area, and history of tobacco and alcohol had no statistical significance ($P > 0.05$). In contrast, the frail group's age, hearing status, vision status, and sleep status are significantly worse than those of the non-frail group ($P < 0.05$); (2) Analysis of Vulnerable Elderly Questionnaire results found that the GDS scores in the frail group were higher than those in the non-frail group, and the MNA and MMSE scores were lower than those in the non-frail group ($P < 0.05$). This indicated that the patients in the frail group had more severe depression, poor nutritional status, and specific impairments in cognitive function. *Conclusion:* Frailty adversely affects elderly cancer patients, and effective measures should be taken to intervene.

Keywords: Frailty; Old age; Tumors; Adverse effects; Intervention

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1. Introduction

With the acceleration of population aging, the number of elderly cancer patients is also increasing yearly. Frailty is defined as a decline in physical function caused by age and other factors, manifested by weakened muscle strength, decreased physical function, and impaired immune function [1,2]. In elderly cancer patients, frailty may lead to decreased tolerance to treatment and increase the risk of adverse effects and complications. In addition

to its impact on treatment efficacy, frailty can also reduce the quality of life of elderly cancer patients. Patients may struggle with daily activities such as walking, standing, and lifting heavy objects. Moreover, frailty may lead to a decline in patients' social skills and emotional problems, such as depression and anxiety. Therefore, this article studies the adverse effects of frailty on elderly cancer patients and the intervention measures to improve the treatment effect and quality of life of elderly cancer patients.

2. General information and methods

2.1. General information

Three hundred sixty-two elderly cancer patients were consecutively admitted to the Oncology Department of the Affiliated Hospital of Hebei University from April 2020 to March 2021. Five physical dimensions of activity were tested on patients, including testing on weight change, grip strength, and fatigue degree as well as a timed up-and-go (TUG) test. Based on the test results, patients were divided into a frail group (n = 128) and a non-frail group (n = 234).

Inclusion criteria included patients aged ≥ 60 years, patients with definite tumor diagnosis (including clinical and pathological diagnosis), patients without mental and cognitive impairments and with average communication skills, and patients with informed consent and voluntary participation.

Exclusion criteria included patients who are bedridden for a long time, have cognitive impairment, patients with advanced malignant tumors and severe organ dysfunction, and patients who cannot complete the frailty assessment.

2.2. Methods

Relying on the Vulnerable Elders Survey-13 (VES-13) scale, the survey was translated into Chinese, reviewed by experts in the Chinese language, and tested for reliability and validity. The two groups of patients were given the translated questionnaire within three days of admission. The questionnaire includes general information (age, gender, education level, marital status, monthly income, area of residence, smoking and alcohol history, hearing, vision, and sleep status), Geriatric Depression Scale (GDS), Mini Nutritional Assessment (MNA), Mini-Mental State Examination (MMSE), and Charlson Comorbidity Index (CC). The scales are scored as follows:

(1) GDS: 30 questions, with a total score of 30 points. GDS score < 6, no depressive symptoms; 6 ≤ GDS score < 11, mild depressive symptoms; 11 ≤ GDS score < 15, moderate depressive symptoms; GDS score ≥ 16, severe depressive state.

(2) MNA: includes four dimensions such as anthropometric measurement, dietary assessment, overall assessment, and self-assessment. The total score is 30 points. MNA score ≥ 24, good nutritional status; 17 ≤ MNA score < 24, potential malnutrition; MNA score < 17, malnutrition.

(3) MMSE: includes five dimensions such as orientation, memory, attention and calculation, recall ability, and language ability. The total score is 30 points. MMSE score ≥ 27, normal; MMSE score < 27, cognitive dysfunction.

(4) CCI: lists 16 common comorbidities, which are divided into four categories according to the severity of the disease divided into 1 point, 2 points, 3 points, and 6 points. The higher the score, the better the patient is.

2.3. Statistical methods

The count data were expressed by the number of cases (n) and percentage (%), and the x^2 test was implemented. The measurement data were expressed by mean ± standard deviation (SD), and the t-test was implemented. P <

0.05 was considered a statistically significant difference.

3. Results

3.1. Comparison of general information

By comparing the general information of the two groups of patients, it was found that the patient's gender, education level, marital status, living area, and smoking and alcohol history had no statistical significance ($P > 0.05$). In contrast, age, hearing, vision, and sleep status were significantly worse than those of the non-frail group ($P < 0.05$).

Table 1. General information

Item		Non-frail group ($n = 128$)	Frailty group ($n = 234$)	t / x^2	P
Gender	Male	74	152	2.194	0.139
	Female	55	81		
Age		77.15 ± 5.2	73.18 ± 4.5	7.589	< 0.001
Education level	Primary school and below	25	41	4.589	0.458
	Junior high school	39	65		
	High school	32	77		
	College and above	32	51		
Marital status	Unmarried	5	14	0.718	0.397
	Single	123	220		
Living area	Town	89	154	0.519	0.471
	Rural area	39	80		
Tobacco and alcohol history	Yes	88	156	0.163	0.686
	None	40	78		
Hearing condition	Hearing loss	52	162	28.013	< 0.01
	Normal hearing	76	72		
Vision condition	Vision loss	59	168	23.371	< 0.01
	Normal vision	69	66		
Sleep status	Sleep disorder	70	183	21.746	< 0.01
	None	58	51		

3.2. Analysis of the Vulnerable Elders Questionnaire results

Analysis of the Vulnerable Elders Questionnaire results found that: (1) the scale scores of the two groups of patients were consistent with statistical significance ($P < 0.05$); (2) the GDS score of patients in the frailty group was higher than that of the non-frailty group, and the MNA and MMSE scores were lower than those of the non-frailty group ($P < 0.05$). This indicated that patients in the frailty group had more severe depression, poor nutritional status, and specific impairments in cognitive function.

Table 2. Analysis of the Vulnerable Elders Questionnaire results

Scale type		Non-frail group (n = 128)	Frailty group (n = 234)	t / x^2	P
GDS score		9.3 ± 1.3	12.7 ± 1.2	25.018	< 0.05
MNA score		17.2 ± 2.0	15.5 ± 2.1	7.488	< 0.05
MMSE score		27.5 ± 1.6	23.2 ± 2.0	20.931	< 0.05
Charlson complications	Yes	59	199	61.302	< 0.05
	No	69	35		

4. Discussion

As the global population ages, the number of elderly cancer patients increases yearly. For these patients, frailty is a common symptom that affects their physical state and profoundly impacts their quality of life. In the study of Feng *et al.* [3], compared with non-frail elderly, the risk of depression in frail elderly was 2.3 times higher, and depression can affect the ability of patients to cope with the disease and aggravate the progression of cancer [4]. When patients experience weakness, it is often accompanied by a loss of appetite. Research by Wu *et al.* has shown that by increasing the patient's protein intake, the risk of frailty in elderly cancer patients can be effectively reduced [5]. Frailty also brings about cognitive decline in elderly cancer patients. Research by Boyle *et al.* has shown a correlation between cognitive dysfunction and frailty in older people [6]. Zheng *et al.* also found that cognitive dysfunction in frail elderly is significantly higher than in ordinary older people [7]. Comorbidities often accompany elderly cancer patients in the frailty period. In the study of Jia *et al.* [8], the risk of frailty in older people with comorbidities was 2.84 times that of older people without comorbidities. These are consistent with the research results of this paper.

Based on the adverse effects of the aforementioned factors on frail elderly cancer patients, joint intervention should be carried out through nutrition, drugs, and exercise. Nutritional intervention can help elderly cancer patients improve their debilitating symptoms and quality of life. Before carrying out the nutritional intervention, it is first necessary to evaluate the nutritional status of elderly cancer patients to understand their chewing and swallowing abilities and nutritional intake. Based on the assessment results, a diet plan suitable for elderly cancer patients is formulated. The diet plan should include sufficient protein, calories, vitamins, and minerals to meet the patient's nutritional needs. Meanwhile, the diet plan should also consider the patient's taste preference and digestive ability and provide foods that are easy to digest and taste good as much as possible [9]. When elderly cancer patients cannot obtain sufficient nutrition through diet, they can consider increasing nutritional supplements through oral, high-protein drinks [10].

Elderly cancer patients often need to take multiple drugs simultaneously, which may interact with each other, resulting in reduced drug efficacy or increased side effects. When prescribing drugs, doctors must fully consider the interactions between drugs to avoid adverse drug interactions. Concomitantly, for elderly cancer patients with many comorbidities, it is necessary to assess their comorbidities and formulate targeted comorbidity management comprehensive plans to ensure patient safety and treatment effectiveness [11,12]. In addition, regular evaluation is the key to ensuring the safety and treatment effect of elderly cancer patients. The patient's physical condition and drug efficacy must be evaluated regularly. The evaluation frequency must be determined according to the patient's situation. It is generally recommended to evaluate at least once a month.

Reasonable exercise is an effective intervention to reduce the probability of frailty in older people [13]. Firstly, exercise can help improve muscle strength and physical function in elderly cancer patients. For example, aerobic exercise and resistance exercise can enhance muscle strength and cardiopulmonary function

and help elderly cancer patients maintain flexibility and balance, thereby reducing the occurrence of falls and other accidents [14]. Secondly, exercise can help improve the mental health of elderly cancer patients. The findings of this article suggest that frailty may contribute to depressive symptoms in elderly cancer patients and that chemicals such as endorphins released by exercise can help patients improve their mood and reduce stress. Finally, as the amount of exercise increases, the older people's muscle strength, body, and visceral functions increase, which improves the patient's nutritional status and assists in the recovery of body functions [15].

In conclusion, frailty will have many adverse effects on elderly cancer patients and effective measures should be taken to intervene based on the patient's situation.

Disclosure statement

The authors declare no conflict of interest.

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