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Original Article

Comprehensive nursing care on the psychological states, quality of life, and serum indexes of NSCLC patients with TCM combined with chemotherapy

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Abstract: Objective: To study the effect of comprehensive nursing care on the psychological status, quality of life, and serum indicators of non-small cell lung cancer (NSCLC) patients undergoing traditional Chinese medicine (TCM) and chemotherapy. Methods: Ninety-two patients with NSCLC admitted to this hospital between January 2018 and June 2020 were recruited for this study. All the patients underwent combined Chinese medicine chemotherapy. The control group underwent conventional nursing care, and the observation group underwent comprehensive nursing. The clinical efficacy, lung function, serum indexes, quality of life, and psychological states of the two groups, their adverse reactions during the treatment period, and the patients' satisfaction with the nursing work were compared. Results: The overall efficacy of the observation group was better in comparison with the control group. After the treatment, the PEF, FVC, and FEV1 levels in the observation group were higher than they were in the control group. After the treatment, the physical functioning, role functioning, emotional functioning, social functioning, and overall health scores in the observation group were higher than they were in the control group. The serum IL-6, TNF-α, and MMP-9 levels in the observation group were lower than they were in the control group. Regarding the incidence of nausea, vomiting, and diarrhea, the observation group had a lower incidence. In terms of of the total satisfaction rate, the observation group was better than the control group (97.83% vs 82.61%), and the differences were all statistically significant ($P<0.05$). Conclusion: Comprehensive nursing can help improve the clinical efficacy of TCM combined with chemotherapy, reduce the serum indicator expression levels, improve the patients' mental states and quality of life, improve patient satisfaction, and reduce the incidence of adverse reactions.

Keywords: Non-small cell lung cancer, mental state, quality of life, serum index, lung function, nursing

Introduction

Lung cancer is a common and life-threatening malignant tumor of the respiratory system [1, 2], and approximately 80% of all lung cancers are non-small cell lung cancer (NSCLC) [3]. However, most of the early NSCLC symptoms are hidden, so it has most often progressed to the advanced stage when diagnosed [4, 5]. For advanced NSCLC, chemotherapy is frequently used, but it often presents certain toxic and side effects, plus the disease itself, so taken together, the patient's health is increasingly poor and becomes intolerant to the chemotherapy [6-8]. With the continuous deepening of traditional Chinese medicine (TCM) theory and clinical research, TCM combined with chemotherapy has played a vital role in NSCLC. Many TCM treatments have been proved to reduce patients' adverse reactions during chemotherapy, further inhibiting tumor cell proliferation and invasion, thereby reducing tumor volumes and decreasing serum tumor factor expressions. In view of the development of clinical treatment programs, clinical care programs need to be improved accordingly. Based on our previous clinical nursing experience and the characteristics of TCM, our hospital has developed a comprehensive nursing plan through evidence-based methods. We examined the effects of this comprehensive nursing program in the context of current research, and the details are summarized as follows.

Materials and methods

Research subjects

In total, 92 NSCLC patients admitted to our hospital during the period January 2018 to June

Table 1. Comparison of the general data between the two groups

	control group (n=46)	research group (n=46)	t/χ^2	P
Age ($\bar{x}$ ± s, years)	57.48±5.38	58.07±5.42	0.524	0.602
Duration ($\bar{x}$ ± s, months)	5.12±1.47	5.17±1.52	0.160	0.873
Sex			0.044	0.417
Male	25	26		
Female	21	20		
TNM stage			0.206	0.902
IIIa	15	13		
IIIb	14	15		
Iv	17	18	0.062	0.804
Pathological type				
Squamous cell carcinoma	36	35		
Adenocarcinoma	10	11		

2020 were randomly and equally placed into two groups. The diagnostic and staging criteria referred to the NSCLC standards in the *China Primary Lung Cancer Diagnosis and Treatment Norms (2015 version)* [9] and the TNM clinical staging standards [10].

Inclusion criteria: ① Patients with first-onset NSCLC. ② Patients in the clinical stages III-IV. ③ Adult patients ≥18 years old. ④ Patients undergoing TCM combined chemotherapy treatment in our hospital. ⑤ Patients with complete clinical data during their treatment. ⑥ Patients and their families who voluntarily participated and who signed the informed consent form. Exclusion criteria: ① Patients with other respiratory diseases. ② Patients with other malignant tumors. ③ Patients with chemotherapy contraindications or who did not meet the requirements for chemotherapy. ④ Patients with mental diseases, consciousness dysfunctions, cognitive dysfunction, or communication disorders. ⑤ Patients in the acute phase of cardiovascular and cerebrovascular adverse events and/or infectious diseases. ⑥ Patients who had surgery or trauma within the previous 14 days. ⑦ Patients with serious digestive system diseases. ⑧ Patients with drug allergies or contraindications. The ethics committee of our hospital approved this study. The baseline data in the two groups were homogeneous (P>0.05). See **Table 1**.

Methods

Treatment: Chemotherapy: On day 1 of the cycle, docetaxel (SFDA approval number H20093092) 75 mg/m^2 was added to 250 ml of 0.9% sodium chloride solution for intravenous infusion. On day s 1 to 5, cisplatin (SFDA approval number H530216-78) 20 mg/m^2 was added to 250 ml of 0.9% sodium chloride injection for intravenous infusion. 4 weeks of treatment was considered a cycle of chemotherapy for 3 consecutive cycles. TCM prescriptions: *Astragalus* and ginseng, 25 g each, *Atractylodes macrocephala* Koidz, ginger processed *Pinellia*, spreading *Hedyotis* herb, and dried tangerine peel, 20 g each; *Inula*, *Solanum*, and *Solanum lyratum Thunb*, 15 g each, *Amomum* and *Ganoderma lucidum*, 10 g each, and licorice, 6 g. The decoction is prepared using the water-decocting method, and the decoction is 240 ml × 2 bags. The decoction is taken in the mornings and evenings for three consecutive cycles of chemotherapy.

Nursing methods: Routine nursing care was performed in the control group, including admission, routine chemotherapy education, routine nursing operations, medication care, and discharge guidance.

The observation group underwent comprehensive nursing care. The specific measures were as follows. ① Admission assessment and general guidance on admission. The nurses introduced the facilities, departments, equipment, etc. in the hospital, and determined the psychological statuses, physical statuses, and health levels of the patients, including their disease courses, combined symptoms, personal habits, family backgrounds, and other information for the evaluation, and then they formulated comprehensive nursing measures based on the evaluation results. ② Psychological care. The nurses provided professional psychological interventions based on each patient's mental state, including music therapy, reading therapy, mindfulness-based cognitive therapy, etc., and they listened to the patients' complaints, encouraged the patients to face the disease positively using the successful prognostic cases, helped the patients find spiritual support, and encouraged the patients to do interesting th-

ings that were good for their physical and mental health. ③ Comfortable care. The nurses assisted patients in rationally arranging the sequence of examinations, according to the specific situation of each patient and the departmental schedules, informed the patients of the details about various examinations and treatments, arranged the relevant nursing operations during the day, supervised the patients to reduce their sleep during the day to improve their sleep quality at night. ④ TCM care. The nurses instructed the patients to observe the improvement of related syndromes, explained the precautions during medication according to the patient's prescriptions, explained the advantages of combined TCM treatment, and supervised the patients to take their medications on time, they advised the patients to prepare mouthwash, candy, etc. to assist the medicine administration, trained the patients to breathe, adjusted their breathing rhythms before taking medicine to prevent choking. ⑤ Chemotherapy indicators. Prior to the chemotherapy, the nurses explained to the patients and their family members the precautions to take during chemotherapy, possible adverse reactions and coping methods, and guided patients to successfully complete the chemotherapy cycle. ⑥ Dietary guidance. The nurses formulated the daily meals during the treatment period and the out-of-hospital diet according to the chemotherapy progress, the Chinese medicine ingredients combined with the patient's personal hobbies, family conditions, etc. ⑦ Exercise intervention. The nurses instructed the patients to actively carry out aerobic exercise during the treatment period. The exercise times and intensity should be tolerable. The nurses paid attention to combining the patient's hobbies so that the patient can persist for a long time. ⑧ Discharge guidance. The nursed established WeChat, SMS and other contacts with the patients, sent guidance, reminders, and other information regularly, organized undergraduate physicians, head nurses, etc. to tell the patients about their diseases through audio, video and other methods, and answered the patients' questions outside the hospital.

Observation indicators

The observation indicators included clinical efficacy, pulmonary function indicators [peak expiratory flow rate (PEF), forced vital capacity (FVC), forced expiratory volume in the first second (FEV1)], the serum indicators [interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α), matrix metalloproteinase-9 (MMP-9)], the patients' quality of life, psychological states, any adverse reactions during the treatment, and the patients' satisfaction with the nursing work.

The clinical efficacy was evaluated according to the evaluation criteria for the efficacy of solid tumors [11]. Complete remission (CR): the target tumor completely disappeared, partial remission (PR): the target tumor is reduced by ≥30% and there were no new lesions, progressive disease (PD): the target tumor is reduced by less than 30% or increased but less than 20% and there are no new lesions, stable disease (SD): the target tumor increased by 20% or more or new lesions occurred. Objective response rate (ORR) = CR + PR.

The quality of life and the mental states were assessed using the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-Core30 (EORTCQLQ-C30) [12]. This questionnaire contains five functional scales (physical, role, cognitive, emotional, social, and general health functioning). A higher score indicates better health.

Before and after the treatment, 5 ml fasting cubital venous blood samples were collected from all the patients in the morning, and the serum was separated by centrifuge, and the expression levels of the serum indexes was determined using the immune enzyme-linked adsorption method.

The patient satisfaction used a four-point response format (very satisfied, satisfied, basically satisfied, and dissatisfied). Total satisfaction = very satisfied + satisfied + basically satisfied.

Statistical analyses

GraphPad Prism version 7.0 and SPSS version 21 (SPSS 21.0; SPSS Inc) were used. The statistical analyses were conducted using SPSS 21.0 software. Independent sample *t* tests were used to assess differences between the measurement data ($\bar{x} \pm s$). The rank data used rank sum tests, the count data used chi-square tests, and the data was expressed in n(%) for-

Table 2. Comparison of the clinical efficacy between the two groups [n (%)]

Group	n	CR	PR	PD	SD	ORR
Control group	46	8 (17.39)	28 (60.87)	7 (15.22)	3 (6.52)	36 (78.26)
Observation group	46	16 (34.78)	26 (56.52)	3 (6.52)	1 (2.17)	42 (91.30)
Z/x^2			-2.292			3.033
P			0.022			0.082

Table 3. Comparison of the lung function between the two groups of patients before and after treatment ($\bar{x} \pm s$)

Groups	Time	PEF (L/s)	FVC (L)	FEV1 (L)
Control group	Before treatment	3.21±0.44	2.14±0.3	1.27±0.23
	After treatment	4.19±0.22	2.98±0.45	2.11±0.29
Observation group	Before treatment	3.19±0.46	2.12±0.26	1.25±0.24
	After treatment	4.95±0.25	3.75±0.40	2.65±0.29
Before treatment	*t*	0.252	0.320	0.366
	P	0.801	0.750	0.716
After treatment	*t*	15.510	8.684	9.191
	P	0.000	0.000	0.000

mat. The significance level of all the analyses was defined as $P<0.05$.

Results

Comparison of the general data

Our comparison of general data between the two groups showed no statistically significant differences, so the two groups were comparable (P>0.05) (**Table 1**).

Comparison of the clinical efficacy

Regarding the total effective rate, a lower level was demonstrated in the observation group (91.30% vs 78.26%), although the difference was not statistically significant (P>0.05), but the overall efficacy of the observation group was better (P<0.05); see **Table 2**.

Comparison of the lung function

Prior to the treatment, no statistical difference was observed in lung function (P>0.05). After the treatment, the observation group demonstrated a higher PEF, FVC, and FEV1 (P<0.05); see **Table 3**.

Comparison of the quality of life and mental states

When considering quality of life, no notable difference was identified in the EORTCQLQ-C30 scale scores between the two groups before the treatment (P>0.05). After the treatment, the functioning scores of the observation group were higher (P<0.05), see **Table 4**.

Serum index comparisons

In terms of the serum indexes, no observable differences were identified between the two groups before the treatment (P>0.05). After the treatment, compared with the control group, the serum IL-6, TNF-α, and MMP-9 levels in the observation group were lower (P<0.05), see **Table 5**.

Comparison of the adverse reactions

Regarding the incidences of nausea, vomiting, and diarrhea, the observation group demonstrated a lower incidence (P<0.05). See **Table 6**.

Nursing satisfaction

In the analysis of the total satisfaction rate, the observation group had a higher total satisfaction level than the control group (97.83% vs 82.61%) (P<0.05), see **Table 7**.

Discussion

NSCLC is a common malignant tumor seen in the clinic, and it has a high mortality rate [13], and it can be attributed to factors such as the

Table 4. Comparison of the EORTCQLQ-C30 scale scores between the two groups of patients ($\bar{x} \pm s$, scores)

Group	Time	Physical functioning	Role functioning	Cognitive functioning	Emotional functioning	Social functioning	General health
Control group	Before treatment	48.83±5.75	48.39±5.48	86.05±5.18	47.90±5.12	45.87±5.21	41.89±4.22
	After treatment	53.88±12.31	54.24±9.89	87.35±5.44	57.33±8.55	51.93±8.42	45.63±6.91
Observation group	Before treatment	48.32±4.34	48.20±5.12	86.54±4.76	47.46±3.68	45.48±5.63	41.69±3.83
	After treatment	59.54±12.60	62.93±11.52	87.53±5.12	72.34±10.60	64.25±8.65	49.28±5.80
Before treatment	*t*	0.482	0.172	0.471	0.476	0.347	0.239
	P	0.631	0.864	0.639	0.635	0.730	0.812
After treatment	*t*	2.180	3.882	0.159	7.473	6.918	2.744
	P	0.032	0.000	0.874	0.000	0.000	0.007

Table 5. Comparison of the serum indexes between the two groups ($\bar{x} \pm s$)

Group	Time	IL-6 (pg/ml)	TNF-α (pg/ml)	MMP-9 (ng/ml)
Control group	Before treatment	71.16±11.13	52.06±6.77	216.72±5.65
	After treatment	56.3±8.73	31.92±6.3	81.14±6.16
Observation group	Before treatment	71.68±10.13	52.54±7.47	217.18±5.51
	After treatment	47.99±8.50	26.01±5.74	73.27±5.25
Before treatment	*t*	0.235	0.321	0.393
	P	0.815	0.749	0.695
After treatment	*t*	4.629	4.704	6.593
	P	0.000	0.000	0.000

Table 6. Comparison of the adverse reactions between the two groups [n (%)]

Groups	n	Bone marrow suppression	Nausea and vomiting	Diarrhea	Liver and kidney function damage
Control group	46	2 (4.35)	16 (34.78)	7 (15.22)	6 (13.04)
Observation group	46	1 (2.17)	5 (10.87)	1 (2.17)	4 (8.7)
x^2		0.345	7.466	4.929	0.449
P		0.557	0.006	0.026	0.503

Table 7. Comparison of the satisfaction rates [n (%)]

Group	n	Very satisfied	Satisfied	Basically satisfied	Dissatisfied	Total satisfaction rate
Control group	46	8 (17.39)	19 (41.30)	11 (23.91)	8 (17.39)	38 (82.61)
Observation group	46	24 (52.17)	18 (39.13)	3 (6.52)	1 (2.17)	45 (97.83)
Z/x^2			-4.204			6.035
P			0.000			0.014

environment, a history of smoking, genetics, etc. [14, 15]. NSCLC usually has no noticeable manifestations in the early stages, and its symptoms are also not typical. Therefore, most patients have progressed to the later stages when they are diagnosed. As the main therapy, chemotherapy for advanced NSCLC exhibits a certain toxicity, and patients' normal cells can also be damaged in the process of inactivating the cancer cells, causing bone marrow suppression, nausea, vomiting, and skin mucosal injuries [16-18]. Due to the discomfort caused by the disease and their fear of death, NSCLC patients are more likely to develop a negative psychological state, and this is not beneficial to the treatment. As the research on TCM deepens, its application in NSCLC chemotherapy has been extensively recognized in clinical practice. Meanwhile, it also brings positive psychological effects to patients, which improves

the psychological states to a certain extent. In view of the changes in the clinical treatment plans, the content of the clinical care should be improved accordingly.

Based on the characteristics of TCM combined with chemotherapy, this hospital formulated a comprehensive nursing plan through evidence-based methods. Comprehensive nursing conducts a comprehensive evaluation of the patients upon admission, which improves the pertinence and efficiency of the nursing measures. From a professional perspective, psychological care provides different intervention programs according to the professional evaluation results of the patient's mental state, which can effectively improve the patient's mental state and reduce the patient's negative emotions. Comfortable care measures can help improve patient comfort, reduce unnecessary or repeated preparations for laboratory treatments, and improve patients' sleep quality, thereby providing a good guarantee for patient treatment and recovery.

Different precautions need to be taken during the application of TCM, such as diet and daily schedule. Because the taste of the TCM decoction is bitter and the respiratory function of lung cancer patients is poor, it is more difficult for them to take it than non-cancer patients. Special care can ensure the efficacy of TCM, reduce the difficulty of taking it, and prevent choking. Diet guidance and exercise care can help improve patients' nutritional levels and immune function of patients, and lay a good foundation for their recovery after the treatment. The out-of-hospital guidance based on the modern information interaction platform can provide patients with psychological support and out-of-hospital self-care guidance, thereby improving the patients' prognostic self-care abilities and their quality of life.

The present study showed that the overall efficacy of the observation group was better than it was in the control group. This suggests that comprehensive nursing measures can help improve the clinical efficacy of TCM combined chemotherapy for NSCLC patients. This finding is consistent with that of Gou [19] Gou who showed improvement of patient-centered outcomes, quality of care, and resource utilization in the comprehensive nursing of liver cancer. Comprehensive nursing care can reasonably decrease the expression levels of the serum related factors and improve pulmonary function, and the quality of life and psychological states of NSCLC patients. NSCLC patients face extremely complex medical systems and challenges and there is no standardized intervention that fits all patients. Comprehensive nursing focuses on "thinking outside the box" and customizes the needs of every patient. Thus, it delivers patient-centered care with Evidence Based Practices, and It handles the challenge of the transition from hospitalization to outpatient clinical care better [20, 21]. The incidences of nausea, vomiting, and diarrhea in the observation group were lower than they were in the control group, indicating that comprehensive nursing measures can reduce the risk of some adverse reactions.

Our nursing strategy for the treatment of NSCLC patients has the following innovations. With a holistic view, lifestyle and psychological interventions are particularly important for improving TCM's effectiveness. This study innovatively carried out nursing intervention according to the characteristics of TCM and achieved good results. However, the following limitations were identified in this study. It was an observational study with a small number of participants and short follow-up. A randomized controlled study with a large sample is needed to confirm this conclusion further.

To sum up, comprehensive nursing care can improve the mental state, quality of life, and serum index expressions of NSCLC patients with chemotherapy and TCM, and can reduce the incidence of adverse reactions.

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Disclosure of conflict of interest

None.

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