

Original Article

The effects of rapid rehabilitation nursing on the clinical efficacy and short-term survival of lung cancer patients

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Abstract: Objective: This study was designed to observe the effects of rapid rehabilitation nursing on the clinical efficacy and short-term survival of lung cancer patients. Methods: A total of 149 patients with lung cancer admitted to our hospital from March 2014 to March 2016 were selected as research subjects. Among them, 77 received rapid rehabilitation nursing during the treatment process and were regarded as the research group, and the other 72 patients received routine nursing during the treatment and were regarded as the control group. The clinical efficacy and the patients' complication incidence rates in the two groups were observed, and a visual analogue scale (VAS) was used to score the patients before surgery (T0), 3 days after surgery (T1), and 7 days after surgery (T2). The time of antibiotic use, drainage duration, intubation time, total hospital stays and nursing satisfaction were compared between the two groups. The Hamilton Depression Scale (HAMD) and the Hamilton Anxiety Scale (HAMA) were used to evaluate the patients before surgery and at discharge. All patients were followed up for 3 years, the follow-up was carried out in the form of a hospital reexamination, and the 3-year survival rates of the patients in both groups were recorded. Results: The effective cure rate of the research group was higher than it was in the control group, and the complication incident rate was lower than it was in the control group ($P < 0.050$). There was no significant difference in the VAS scores between the two groups at T0 ($P > 0.050$), and the VAS score in the research group was significantly lower than the scores in the control group at T1 and T2 ($P < 0.001$). The time of antibiotic use, drainage duration, intubation time, and total hospital stays in the research group were shorter than they were in the control group ($P < 0.001$), and the nursing satisfaction was better than it was in the control group ($P < 0.050$). There was no significant difference in the HAMD and HAMA scores between the two groups before surgery ($P > 0.050$). After treatment, the HAMD and HAMA scores in the research group were significantly lower than they were in the control group ($P < 0.001$). However, there was no significant difference in the two groups' 3-year survival rates ($P > 0.050$). Conclusion: Rapid rehabilitation nursing can effectively improve the clinical efficacy of lung cancer patients and reduce the complication incident rate. It will have an extremely high application value in the future clinical treatment of lung cancer.

Keywords: Rapid rehabilitation nursing, lung cancer, VAS, prognosis, HAMD

Introduction

Lung cancer, which originates from the bronchial mucosal epithelium, is currently the most common primary malignant tumor of the lungs [1]. In recent years, the morbidity and mortality of lung cancer have both increased rapidly in industrialized countries [2]. Lung cancer currently accounts for 8.5% of all malignant tumors [3], and about 1.6 million people worldwide died of lung cancer in 2012 [4]. The fatal-

ity rate of lung cancer is also the highest among clinical malignant tumors, seriously threatening the life and health of patients [5]. At present, the pathogenesis of lung cancer is not yet clear, and a large number of data show that the risk factors of lung cancer include smoking, asbestos, ionizing radiation, etc. [6]. Early stage lung cancer has no special clinical symptoms and may go unnoticed by patients. Generally, by the time it's diagnosed the disease has developed to the middle or late stages [7]. At present, the

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clinical treatment of lung cancer is mainly surgery combined with chemotherapy, and about 80.24% of patients can achieve a good lesion separation during surgical resection [8]. However, in the process of postoperative rehabilitation, the normal lung tissue in the radiation field is easily damaged by radiation and a series of inflammatory reactions [9], and the mild cases will suffer dyspnea and lung function damage. Moreover, serious and extensive pulmonary fibrosis will occur in severe cases, directly endangering the lives of patients [10]. Some studies have suggested that targeted nursing measures during the treatment of lung cancer patients might be the key to improving patient prognosis [11]. Among them, rapid rehabilitation nursing involves a series of optimization measures during the perioperative period achieved by consulting hospital evidence. Through multidisciplinary assistance in surgery, anesthesia, nursing, and nutrition, patients' stress responses during the perioperative period can be reduced and the rapid rehabilitation of patients undergoing surgery can be promoted [12]. Pagnotta and others [13] pointed out that rapid rehabilitation nursing significantly improves the postoperative efficacy of patients undergoing total knee replacement, while Wainwright and others [14] proved that rapid rehabilitation nursing also has a higher application value for spinal surgery. However, the value of rapid rehabilitation nursing in the treatment of lung cancer has not yet been confirmed. We suspected that the application of rapid rehabilitation nursing could improve the clinical efficacy and prognosis of patients, and the disease was analyzed experimentally to provide reference and guidance for the future clinical treatment of lung cancer.

Materials and methods

General information

A total of 149 patients with lung cancer admitted to our hospital from March 2014 to March 2016 were selected as the research objects. Among them, 77 who received rapid rehabilitation care during the treatment process were selected as the research group, and the other 72 patients who received routine nursing alone during the treatment were selected as the control group. This experiment was approved by the Ethics Committee of our hospital, and all

the above research subjects signed an informed consent.

Inclusion and exclusion criteria

The inclusion criteria were as follows: Patients having the clinical manifestations of lung cancer; The lung cancer was confirmed after a biopsy by the pathology department of our hospital; Patients aged 30-70 years; Patients with complete case data. The exclusion criteria were as follows: Patients with other tumors; Patients with organ failure; Patients with autoimmune defects and infectious diseases; Patients with a neurological dysfunction; Patients with cardiovascular and cerebrovascular diseases; Patients with other tumors, or with a physical disability and long-term bed rest; Pregnant women; Patients with poor treatment compliance; Patients transferred halfway to another hospital; Patients with drug allergies; Patients who received antibiotic therapy within 3 months before their admission.

Methods

All patients underwent a radical resection in our hospital, which was completed by senior surgeons in our hospital. The control group exercised routine nursing during treatment, including monitoring changes in the patients' vital signs, giving some simple health education to the patients, guiding and assisting the patients to complete their rehabilitation medication. During the treatment process, the research group carried out targeted and rapid rehabilitation nursing according to each patient's history of smoking, sputum excretion, vital capacity, exercise load and blood gas function. The main contents could be stated as follows: before surgery, the patients were given atomization inhalation therapy, and the patients and their families were required to quit smoking, daily respiratory function training (abdominal respiratory training, cough training, balloon blowing training, etc.), detailed psychological counseling was given to them, and health education was carried out. Six hours after surgery, we assisted and guided their family members to perform simple bed activities and start drinking water or eating food. One day after surgery, we guided and assisted them in simple daily activities, guided body therapy to promote expectoration and remove respiratory secretions,

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used a multi-functional mobile frame to assist them to complete walking activities, and carry out aerobic activities of different degrees according to the results of their chest x-rays. The thoracic duct was removed when the drainage fluid was less than 200 mL.

Observation indicators

Clinical efficacy of the patients in the two groups: The clinical symptoms and lesions of the patients completely disappeared within 4 weeks were classified as complete remission; the tumor focus decreased and the sum of the longest diameters of the tumor reduced by $\geq 30\%$ and maintained for more than 4 weeks were classified as partial remission; a decrease in the sum of the longest diameters of the tumors $< 30\%$ was considered stable; an increase $\geq 10\%$ in the sum of the longest diameters of tumors was considered as progression; the effective cure rate = (complete remission + partial remission)/total $\times 100\%$.

Incidence rate of complications: The complications that occurred from postoperative time to discharge time were recorded and the complication incident rate was calculated.

Pain: The visual analogue scale (VAS) was used to score the patients before surgery (T0), 3 days after surgery (T1) and 7 days after surgery (T2).

Rehabilitation efficiency: The duration of antibiotic use, the drainage duration, intubation time, and total hospital stays of the patients in the two groups were compared.

Nursing satisfaction: The self-made nursing satisfaction questionnaire was used to evaluate the patients' nursing satisfaction, and the survey was conducted when the patients were discharged from the hospital, with a total score of 100 points. The survey content included the degree of satisfaction of the nursing staff, nursing ability, self-income, etc. Scores > 90 were rated as very satisfactory, scores 80-90 were rated as satisfactory, scores 60-79 were rated as requiring improvement, and scores < 60 were rated as unsatisfactory.

Mental state: the Hamilton Depression Scale (HAMD) and the Hamilton Anxiety Scale (HAMA)

were used to investigate the patients before surgery and at discharge.

Prognosis: All patients were followed up for 3 years, the follow-up was conducted in the form of hospital reexamination, and the 3-year survival of the patients in the two groups was recorded.

Statistical methods

SPSS22.0 statistical software was used to analyze the data, and GraphPad 8 graphics software was used to illustrate the findings. The count data, such as the general data, the curative effect, and the complication rates of the two groups are expressed as (%), the comparisons between the groups are performed using chi square tests; the measurement data such as a patient's age, VAS score and antibiotic use duration are expressed in the form of (mean \pm standard deviation), the comparisons between the groups are performed using t tests; the comparisons between multiple time points are performed using repeated measurement ANOVA and Bonferroni tests. The survival rate was calculated using the Kaplan Meier method and compared with log rank tests ($P < 0.050$).

Results

There were no significant differences between the two groups in terms of the general data.

The ages, BMI, TNM staging, degree of differentiation, previous medical history, smoking, drinking, genders, places of residence, and metastasis of the patients in the two groups were compared, with no significant differences ($P > 0.050$), as shown in **Table 1**.

The effect of the study group is better than that of the control group

The effective cure rate of the patients in the research group was 86.11%, which was 72.73% higher than that the cure rate in the control group ($P = 0.044$), as shown in **Table 2**.

The incidence of complications in the study group was lower than it was in the control group complication incident rate.

The complication incident rate in the research group was 13.89%, significantly lower than the

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Table 1. Comparison of the general data of the patients in the two groups [n (%)]

	Research group (n = 72)	Control group (n = 77)	t or χ^2	P
Age (years)	52.6±6.85	53.8±7.62	1.008	0.315
BMI (kg/m ²)	24.86±1.76	24.97±1.82	0.375	0.709
TNM staging			0.119	0.730
I-II	45 (62.50)	46 (59.74)		
III-IV	27 (37.50)	31 (40.26)		
Degree of differentiation			0.150	0.698
Poorly differentiated	24 (33.33)	28 (36.36)		
Moderately and highly differentiated	48 (66.67)	49 (63.64)		
Previous medical history			1.066	0.587
Hypertension	26 (36.11)	25 (32.47)		
Diabetes	17 (23.61)	24 (31.17)		
No	29 (40.28)	28 (36.36)		
Smoking			0.524	0.724
Yes	65 (90.28)	72 (93.51)		
No	7 (9.72)	5 (6.49)		
Drinking			0.165	0.685
Yes	58 (80.56)	64 (83.12)		
No	14 (19.44)	13 (16.88)		
Gender			0.625	0.429
Male	52 (72.22)	51 (66.23)		
Female	20 (27.78)	26 (33.77)		
Place of residence			0.099	0.753
Cities and towns	54 (75.00)	56 (72.73)		
Countryside	18 (25.00)	21 (27.27)		
Transfer			0.165	0.685
Yes	14 (19.44)	13 (16.88)		
No	58 (80.56)	64 (83.12)		

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

	Research group (n = 72)	Control group (n = 77)	χ^2	P
Complete remission	39 (54.17)	31 (40.26)		
Partial remission	23 (31.94)	25 (32.47)		
Stable	6 (8.33)	13 (16.88)		
Progression	4 (5.56)	8 (10.39)		
Effective cure rate (%)	86.11	72.73	4.045	0.044

rate in the control group (27.27%) (P = 0.044), as shown in **Table 3**.

The study group's VAS scores were lower the control group's VAS scores

There was no significant difference in the VAS scores between the two groups at T0 (P > 0.050), but the VAS scores in the research group were significantly lower than the scores

in the control group at T1 and T2 (P < 0.001), and the VAS scores of both groups were the highest at T0, lower at T1 and lowest at T2 (P < 0.001), as shown in **Figure 1**.

The rehabilitation efficiency of the study group was better than it was in the control group

The duration of antibiotic use, the drainage duration, intubation time

and total hospital stays in the research group were significantly shorter than they were in the control group (P < 0.001), as shown in **Figure 2**.

The nursing satisfaction in the study group was higher than it was in the control group

There was no significant difference between the two groups (P > 0.050) in the number of patients who were satisfied and those who indi-

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Table 3. Comparison of the complications between the two groups [n (%)]

	Research group (n = 72)	Control group (n = 77)	χ^2	P
Atelectasis	2 (2.78)	4 (5.19)		
Respiratory insufficiency	1 (1.39)	3 (3.90)		
Pleural infection	2 (2.78)	3 (3.90)		
Pleural effusion	0 (0.00)	2 (2.60)		
Incision infection	1 (1.39)	3 (3.90)		
Arrhythmia	4 (5.56)	6 (7.79)		
Incidence rate (%)	13.89	27.27	4.045	0.044

There was no difference in the prognoses between the study and control groups

A total of 149 patients were followed up for 3 years, and 142 patients were successfully followed up, for a follow-up success rate of 95.30%. The research group lost 3 cases and the control group lost 4 cases. There were no significant differences in the 3-year survival rates between

the two groups ($P > 0.050$), as shown in **Figure 4**.

Discussion

Lung cancer, one of the most common malignant tumors in China, has a high morbidity and mortality in clinical practice and has been increasing and decreasing in recent years [15, 16]. Excision surgery is the most common method to treat lung cancer clinically at present, but due to its extensive incision and invasive operation, it has a great negative impact on the patients' rehabilitation [17]. Moreover, for some elderly patients with slightly weaker body functions, the possibility of causing other postoperative pulmonary complications greatly increases [18]. With increased research, both domestic and foreign studies have pointed out that the intervention of nursing methods has had a certain improvement effect on the rehabilitation and adverse reactions after tumor surgery [19-21]. However, the application value of rapid rehabilitation nursing in lung cancer has not yet been confirmed, and this experiment is of great clinical significance by comparing the application value of rapid rehabilitation nursing and routine nursing in the perioperative period of lung cancer patients.

The results of this experiment showed that the clinical efficacy of the patients in the research group applying rapid rehabilitation nursing was significantly better than it was in the control group using conventional nursing, and the incidence rate of adverse reactions was significantly lower than it was in the control group, suggesting that rapid rehabilitation nursing has an extremely high application value for lung cancer. This finding is also consistent with

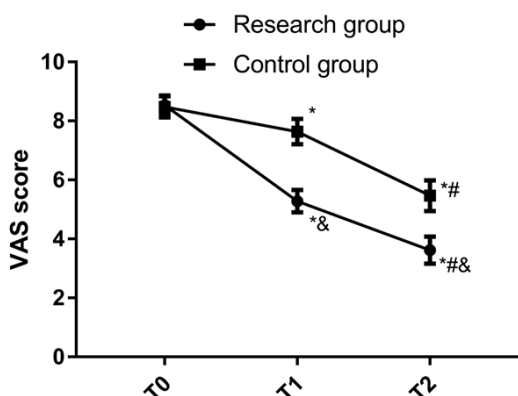


Figure 1. Comparison of the VAS scores between the two groups. *indicated a comparison of the VAS score in the same group ($P < 0.001$); #indicated the VAS score at T₁ compared with the same group ($P < 0.001$); &indicated a comparison of the VAS scores in the research group in the same period ($P < 0.001$).

cated the nursing needed improvement, but the research group had significantly more patients who were very satisfied than the control group did ($P = 0.003$), while those who were not satisfied were significantly fewer than the control group ($P = 0.013$), as shown in **Table 4**.

The psychological state of the study group was better than it was in the control group

There was no significant difference in the HAMD and HAMA scores between the two groups before surgery ($P > 0.050$); after treatment, the HAMD and HAMA scores in the research group were significantly lower than they were in the control group ($P < 0.001$), and the HAMD and HAMA scores of the two groups were significantly lower after treatment than before ($P < 0.001$), as shown in **Figure 3**.

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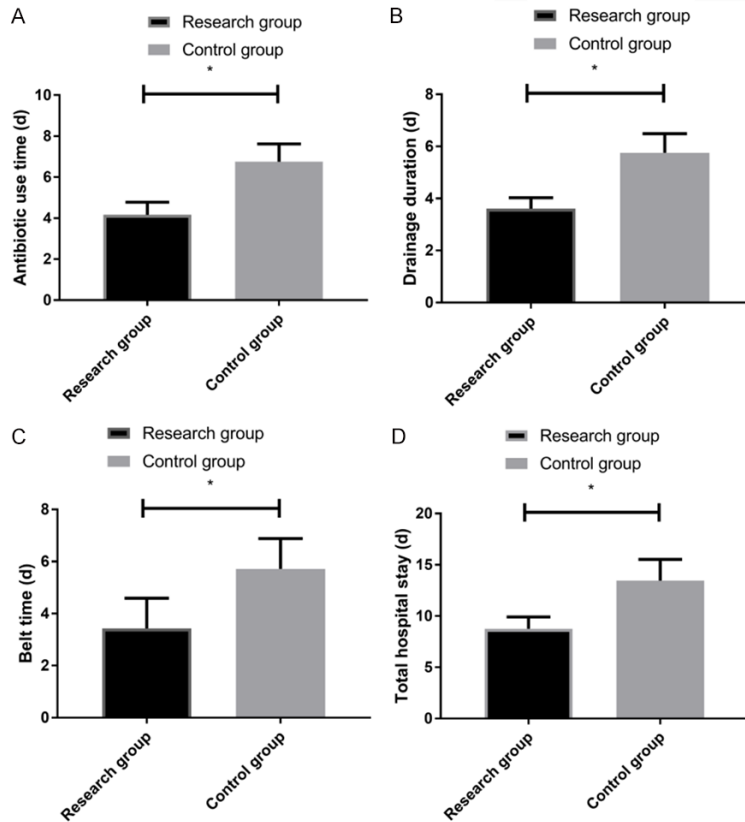


Figure 2. Comparison of the rehabilitation efficiency between the two groups. A. Comparison of the duration of antibiotic use between the two groups (* $P < 0.001$). B. Comparison of the drainage duration between the two groups (* $P < 0.001$). C. Comparison of the intubation time between the two groups (* $P < 0.001$). D. Comparison of the total hospital stays between the two groups (* $P < 0.001$).

Table 4. Comparison of the nursing satisfaction between the two groups [n (%)]

	Research group (n = 72)	Control group (n = 77)	χ^2	P
Very satisfied	49 (68.06)	34 (44.16)	8.613	0.003
Satisfied	13 (18.06)	18 (23.38)	0.639	0.424
needs improvement	8 (11.11)	14 (18.18)	1.478	0.224
Dissatisfied	2 (2.78)	11 (14.29)	6.188	0.013

Khoury and others [22] in the study of rapid rehabilitation nursing in laparoscopic colorectal surgery, which supports the findings of this experiment. Rapid rehabilitation nursing is an optimized nursing intervention measure based on evidence-based medicine, which can minimize the stress response of surgery to the body and promote patients' postoperative rehabilitation [23]. We speculated that the efficacy of rapid rehabilitation nursing for lung cancer

patients was mainly reflected in the following points: 1. Atomization therapy and respiratory training before surgery could improve the lung function of patients in response to surgery, increase respiratory resistance, reduce the damage to lung tissue due to invasive surgery and mechanical injury, and avoid small bronchus drying. 2. Patients usually suffer from irritability, confusion, resistance and other negative emotions due to unknown diseases and a fear of surgery before surgery [24]. This state is not only bad for the postoperative rehabilitation care of patients, but it also makes it easy for patients to lose confidence in recovery. Therefore, rapid rehabilitation nursing requires detailed psychological counseling before surgery, explaining the relevant knowledge of the disease to the patients, and teaching the patients some simple rehabilitation treatments, which not only can imperceptibly reduce the patients' fear of the disease, but also can close the relationship between doctors and patients and enhance the patients' trust in the hospital, which is very significant to the process of rehabilitation. And we also found that the patients in the research group were significantly lower than those in the control group after treatment in terms of their HAMD and HAMA scores, which also

explained the positive effect of rapid rehabilitation nursing on the patients' mental states. 3. Postoperative rehabilitation training for patients is more conducive to postoperative rehabilitation. Generally, patients need to stay in bed for a long time after invasive tumor resection. Long-term bed rest is not only bad for the recovery of incisions and tissues, but it also may cause complications such as lower limb deep vein thromboses and pressure ulcers

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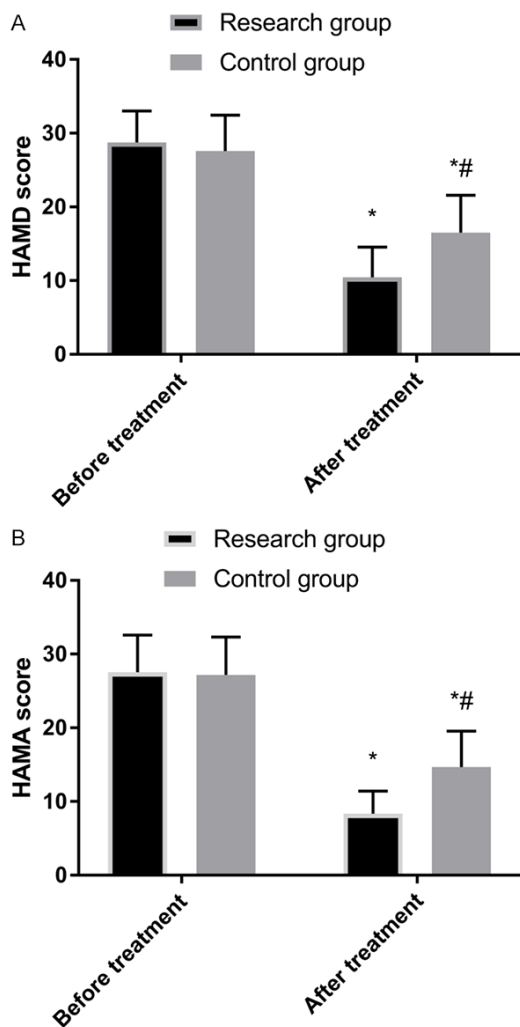


Figure 3. Comparison of the patients' psychological statuses between the two groups. A. Comparison of the HAMD scores between the two groups before and after treatment. B. Comparison of the HAMA scores between the two groups before and after treatment. *indicated a comparison of the score in the same group before treatment ($P < 0.001$), and #indicated a comparison of the score in the research group after treatment ($P < 0.001$).

[25]. However, rapid rehabilitation nursing can accelerate the activities of cells and hemodynamics [26] and improve the rehabilitation time of incisions by guiding and assisting patients to carry out appropriate aerobic activities in the rehabilitation process. This could also be proved by comparing the duration of antibiotic use, the drainage duration, intubation time and total hospital stays between the two groups.

With the widespread application of the concept of rapid rehabilitation in China, more and more

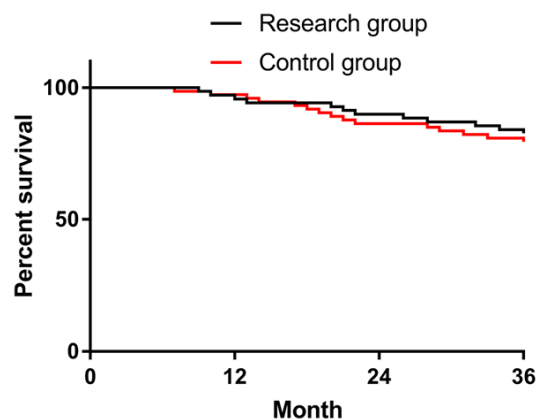


Figure 4. 3-year survival curve of patient prognosis in the two groups.

scholars are combining the concept of rapid rehabilitation with their own specialties and applying it to their fields of study [27, 28]. However, we investigated patients' nursing satisfaction degrees between the two groups and found that the patients in the research group were significantly more satisfied than those in the control group, with significantly less dissatisfaction than the control group. This also confirmed that the application of rapid rehabilitation nursing in lung cancer was highly affirmed by the patients and its clinical value was confirmed. However, when we compared the patient prognosis and survival between the two groups, we discovered that there was no significant difference between the two groups. We speculated that the discrepancy with this study might be due to the small number of cases included in this study, so the difference was not statistically significant. In addition, patients in this study mainly had early stage lung cancer, and the prognosis of such patients is usually better than that of patients with advanced stage lung cancer. We will expand the sample size for further analysis as soon as possible.

At present, there are many nursing interventions in clinical practice. In this study, only routine nursing was compared as a control, and it was not ruled out that the differences between rapid rehabilitation nursing and other nursing methods might not be so significant. This will be analyzed as a key research direction in the future. Moreover, due to the short experimental period, we cannot judge the impact of rapid rehabilitation nursing on the long-term prognosis of patients. We will conduct a longer-term

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follow-up investigation on the subjects in this study to improve our results.

In conclusion, rapid rehabilitation nursing can effectively improve the clinical efficacy of lung cancer patients, reduce the complication incidence rate, and has an extremely high application value in the future treatment of clinical lung cancer.

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Disclosure of conflict of interest

None.

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