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Effects of Perioperative Pain Intervention on Postoperative Rehabilitation of Patients with Partial Resection of Lung Cancer

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Abstract

Objective: To explore the effect of perioperative pain intervention on postoperative rehabilitation of patients who underwent thoracoscopic partial resection of lung cancer. **Methods:** From January 2021 to May 2021, 100 patients with primary lung cancer who underwent thoracoscopic partial lung resection in Cardiopulmonary Department II of Cancer Center in our hospital were selected. They were divided into observation group and control group by random number table. Routine nursing after surgery was used in both groups, the observation group was given perioperative pain intervention nursing on the basis of routine nursing, and the postoperative pain (6 h, 12 h, 24 h, 48 h after operation), the rate of out-of-bed activity within 24 h after operation, lien chest tube time, the incidence of postoperative complications, the influence of pain on daily life, the satisfaction of patients with pain control methods and pain education and the satisfaction of discharged patients were observed and recorded. **Results:** There was no significant difference in general data (age, sex, educational level, course of disease, TNM stage of lung cancer, maximum diameter of tumor (CM), surgical site) between the two groups (P > 0.05); the NRS scores of the observation group at 6, 12, 24 and 48 hours after operation were all lower than those in the control group, and the difference was statistically significant (P < 0.05); after operation, the rate of 24 h out-of-bed activity in the observation group was higher than that in the control group, the lien chest tube time was shorter than the control group, and the incidence of postoperative complications was lower than that in the control group, the difference was statistically significant (P < 0.05); after operation, the effect level of pain in the observation group was lower than that in the control group, and the satisfaction of pain health education, pain control methods and discharged patients was higher than that in the control group, with statistical significance (P < 0.05). **Conclusion:** Perioperative pain

intervention can effectively relieve postoperative pain state of patients, promote patients' early out of bed and conducive to lung expansion, shorten the time of lien chest tube, reduce postoperative complications and the impact of pain on daily life, help patients recover as soon as possible, and improve the satisfaction of patients for medical treatment.

1. Introduction

Lung cancer is a kind of cancer with the highest morbidity and mortality in the world [1], and it is the main cause of cancer-related death [2]. According to GLOBO-CAN2020 data, the incidence and mortality of lung cancer in China account for 37.0% and 39.8% of the world respectively [3], which is a major problem in cancer prevention and treatment in China. Surgical resection is the main treatment for early and middle stage lung cancer, and it is also an important method to cure lung cancer clinically at present [4]. Thoracoscopic lobectomy is a safe, minimally invasive and effective operation. Compared with traditional thoracotomy, it has less trauma, less bleeding, faster recovery, less impact on cardiopulmonary function, and reduces the operation risk to a certain extent [5]. It has been widely used in clinic in recent years [6] [7] [8]. However, the physical and psychological effects of surgery on patients are still inevitable. Some patients stay in bed absolutely because of postoperative pain, which increases the risk of postoperative complications such as lung infection, atelectasis and deep venous thrombosis of lower limbs, which is not conducive to the rapid recovery of postoperative patients [9]. Cao Fang [10] *et al.* believe that early pain nursing intervention can reduce the incidence of lung infection, effectively reduce NRS score and improve patient satisfaction. This study will focus on the effect of perioperative pain intervention on postoperative rehabilitation of patients with partial resection of lung cancer under thoracoscope, and provide reference for formulating high-quality and practical nursing programs for patients with partial resection of lung cancer. It is reported as follows.

2. Data and Methods

2.1. Clinical Data

From January 2021 to May 2021, 100 patients with primary lung cancer who underwent thoracoscopic partial lung resection in the Second Department of Cardiopulmonary Cancer in our hospital were selected. All of them were adenocarcinoma in histopathology. They were randomly divided into observation group and control group, with 50 patients in each group. Inclusion criteria: 1) It meets the diagnostic criteria of "Standards for diagnosis and treatment of pri-

mary lung cancer in 2018", meets the surgical indications, and the surgical method is video-assisted thoracoscopic single lobe partial resection; 2) Did not receive lung cancer-related treatment (lung surgery, targeted therapy, immunotherapy, radiotherapy and chemotherapy) before operation; 3) Good cognitive comprehension ability, voluntary participation and cooperation in this study. Exclusion criteria: 1) Patients with preoperative dyskinesia or patients with serious basic diseases (heart disease, liver and kidney dysfunction, abnormal coagulation function, mental illness); 2) Those who need multiple operations cannot participate in this study. There was no significant difference in age, sex, education level, course of disease, TNM stage of lung cancer [11], maximum tumor diameter (cm) and surgical site between the two groups (P > 0.05), which was comparable (see Table 1).

2.2. Methods

2.2.1. Surgical Methods

Patients in both groups were given antibiotics 30 minutes before operation, and after inhalation general anesthesia, double-lumen endotracheal intubation was performed. The patients were taken to the lateral position and raised their chest with posture pad, and both sides were fixed. The surgical incision with a length of about 4 cm between the fourth intercostal line of the front axillary line and the endoscopic hole with a length of about 5 cm between the middle axillary line of the same intercostal line were taken for routine disinfection. By entering the

Table 1. Comparison of baseline data between two groups of patients.

Item	Category	Control group (n = 50)	Observation group (n = 50)	t/χ^2	P
Age (years)		51.780 ± 10.829	50.220 ± 10.100	−0.745	0.458
Gender	Male	18	17	0.044	0.834
	Female	32	33		
Education level	Primary school	5	5	3.382	0.848
	Junior high school	7	8		
	High school	15	10		
	Junior college or above	23	27		
Course of disease (year)		1.899 ± 0.748	1.791 ± 0.586	−0.804	0.424
TNM staging	0	2	2	4.174	0.124
	1	44	48		
	2	4	0		
Maximum tumor diameter (cm)		13.780 ± 7.291	13.980 ± 7.852	0.132	0.895
Surgical site	Left side	20	21	0.041	0.839
	Right side	30	29		

chest, exploration is carried out; Read the film to judge the nodule site before operation, and mark the resection range with electric hook; Free lung segments and bronchus and release surrounding lung tissue; Bronchial occluder was used to resect the diseased lung tissue, and the specimens were taken out completely for examination. Hilar and mediastinal lymph were cleared, thoracic cavity was cleaned, observation mirror and operation mirror were withdrawn, drainage tube was placed, and the wound was sutured and bandaged. The patient was sent to the anesthesia resuscitation room and sent back to the ward after the patient was awake.

2.2.2. Nursing Methods

1) Control Group

Routine surgical care, including preoperative care and postoperative care, was given, and the responsible nurses gave guidance to patients and their families. Preoperative nursing includes explaining lung cancer related knowledge to patients and their families and matters needing attention during perioperative period. According to the doctor's advice, the patients were given intravenous injection of parecoxib sodium 40 mg bid 3 days after operation, and the patients were instructed to perform functional exercise after waking up.

2) Observation Group

On the basis of the control group, perioperative pain intervention was implemented, and a standardized perioperative pain management team was established, including pain specialist nurses in cancer center and all medical staff in the department. Among them, the head nurse is the main person in charge of the team; Pain specialist nurses are responsible for organizing the training and assessment of nurses in departments, and participating in the discussion and formulation of pain nursing plans; doctors are responsible for formulating and adjusting the treatment plan according to WHO's three-step analgesic treatment guidelines for cancer pain [12]; the responsible nurse is responsible for assessment, execution of doctor's advice, observation of illness and health education. The specific program includes: a) Preoperative evaluation: To obtain the patient's condition information in the form of face-to-face conversation, to understand the patient's disease progression stage, subjective cognition of the disease, his own personality characteristics, the expectation of prognosis and survival, and to comprehensively evaluate the patient's physiological and mental health status. b) Preoperative nursing: The responsible nurse introduced the pain mechanism, clinical manifestations and non-drug relief methods (music therapy, acupoint massage, a kind of traditional Chinese shadowboxing (tai chi chuan) and Baduanjin [13]) to patients and their families. And explain the classification of pain in detail through brochures, Teach patients to self-evaluate pain according to the actual situation of pain, Give comfort and encouragement with supportive language, At the same time, peer education is used to introduce patients who have recovered well after operation, encourage the exchange of experiences, increase patient information, reduce fear, inspire patients' desire to overcome

diseases, and mobilize the subjective initiative of family members to provide more family support, thus improving the quality of life of lung cancer patients after operation [14]. c) Postoperative pain evaluation: The responsible nurses follow the routine, quantitative, comprehensive and dynamic evaluation principles, and regularly evaluate and record the postoperative pain of patients by using the pain digital score scale (NRS) [15], including the location, nature and duration of pain. According to different administration routes, different evaluation opportunities were selected, which were evaluated after intravenous administration for 15 min, subcutaneous administration for 30 min and oral administration for 1 h. d) Postoperative pain nursing: corresponding nursing should be carried out according to the pain grade of patients, and non-drug nursing measures should be given priority when NRS score is 1 - 3 (mild pain); NRS score ≥ 4 points for comprehensive treatment to relieve pain, including drug treatment and psychological counseling according to the principle of three-step analgesia, so as to alleviate patients' anxiety and fear. e) Pipeline care: Paste pipe identification, The pipeline is fixed by holding high and lifting horizontally, Record the location, time, exposed scale, fixation and local wound of the pipeline. The focus of each shift is handed over. At the same time, the patient should be instructed to turn over, sit up and get out of bed slowly, and do not suddenly change the body position. When getting out of bed, use a special walker that can hang the drainage bottle. When going out for inspection, use a wheelchair, properly place the drainage bottle, and do not pull hard to prevent the pipeline from coming out [16]; on the other hand, informs the patient that there are sutures in the skin of the pipeline, which will not come out due to normal activities, thus alleviating the patient's worries and facilitating the patient to get out of bed early after operation. f) Implement diversified pain education models: including oral education, distribution of pain manuals, make a pain knowledge publicity column, etc., to provide comprehensive health education for patients, teach patients to correctly understand pain and improve treatment compliance [17]. g) Actively deal with the adverse reactions of using painkillers: such as constipation, nausea, vomiting and dizziness, find problems in time and treat them symptomatically to reduce adverse drug reactions [18]. h) Reflection and optimization: During the implementation of the pain nursing plan, we should closely monitor the nursing effect, optimize and reform the problematic nursing plan or the imperfect nursing process, and ensure that the observation group has implemented the pain nursing plan formulated in this study.

2.3. Observation Indicators

The degree of postoperative pain (6 h, 12 h, 24 h, 48 h), the rate of getting out of bed within 24 hours after operation, the incidence of postoperative complications, the influence of pain on patients' daily life, the satisfaction of patients with pain control methods and pain education and the satisfaction of discharged patients were compared between the two groups. Patient pain degree score: NRS was used to evaluate, with a total score of 10 points. The higher the score, the

higher the pain degree; 0 is painless, 1 - 3 is mild pain, 4 - 6 is moderate pain, and 7 - 10 is severe pain. The responsible nurse recorded the time when the patient got out of bed for the first time after operation and time of remove chest tube, observed whether there were postoperative complications, and evaluated the patient's pain according to three modules in Houston Pain Outcome Instrument (HPOI) [19]: the influence of pain on patients' daily life, patients' satisfaction with pain health education and patients' satisfaction with pain control methods. There are 16 items in this questionnaire, each item has 10 points, and the total score is 160. The higher the pain influence level, the higher the reaction pain degree and the higher the satisfaction score, which means that the patients are more satisfied with pain control, and the Cronbach's α coefficient is 0.770. The responsible nurses evaluated the satisfaction of discharged patients according to five grades (very dissatisfied, dissatisfied, satisfied, relatively satisfied and very satisfied) before discharge, and made records.

2.4. Statistical Methods

Excel is used to establish a database, and two people enter and check the data. SPSS24.0 software was used for data analysis. Mean and standard deviation were used to measure data, frequency and percentage were used to count data, independent sample t test or χ^2 test was used to compare between groups, P was bilateral test, and $P < 0.05$ was used to show significant difference, which was statistically significant.

3. Results

3.1. Comparison of Postoperative Pain Scores between the Two Groups

The degree of postoperative pain in the two groups decreased with the increase of time, and the NRS score of the control group was higher than that of the observation group. The difference of pain scores at 6 h, 12 h, 24 h and 48 h after operation was statistically significant ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of NR scores between the two groups at 6 h, 12 h, 24 h and 48 h after operation.

	Grouping	Number of cases	$\overline{x} \pm s$	t	P
6 h after operation NRS score	Observation group	50	5.280 ± 0.858	−2.021	0.046
	Control group	50	5.720 ± 1.278		
12 h after operation NRS score	Observation group	50	3.940 ± 0.935	−2.035	0.045
	Control group	50	4.360 ± 1.120		
24 h after operation NRS score	Observation group	50	2.480 ± 0.762	−3.567	0.001
	Control group	50	3.040 ± 0.807		
48 h after operation NRS score	Observation group	50	1.580 ± 0.731	−3.394	0.001
	Control group	50	2.060 ± 0.682		

3.2. Comparison of the Rate of Out-of-Bed Activity within 24 Hours after Operation between the Two Groups

The rate of out-of-bed activity within 24 hours after operation in the observation group was 62%, which was higher than that in the control group (40%). The difference between the two groups was statistically significant (P < 0.05), as shown in Table 3.

3.3. Comparison of Postoperative Pleural Tube Time in the Two Groups

The postoperative retention time of the observation group was shorter than the control group, and the two groups were significant (P < 0.05), as shown in Table 4.

3.4. Comparison of the Incidence of Postoperative Complications between the Two Groups

The incidence of postoperative complications in the control group (16%) was higher than that in the observation group (4%), and the difference between the two groups was statistically significant (P < 0.05), as shown in Table 5.

3.5. Comparison of Postoperative Pain Control between the Two Groups

After operation, the effect of pain on daily life in the observation group was lower than that in the control group, and the satisfaction of pain control methods and health education was higher than that in the control group, with statistical significance (P < 0.05). See Table 6 for details.

Table 3. Activity rate of getting out of bed within 24 hours after operation (n, %).

Group	Number of cases	Yes	No	Rate of out-of-bed activity (%)	χ^2	P
Control group	50	20	30	40%	4.842	0.045
Observation group	50	31	19	62%		

Table 4. Comparison of the pipeline lien time between the two groups.

	Group	Number of cases	$\bar{x} \pm s$	t	P
Lien chest tube time(min)	Control group	50	2707.700 ± 1415.292	−2.076	0.041
	Observation group	50	3338.120 ± 1615.204		

Table 5. Incidence of postoperative complications in two groups (n, %).

Group	Number of cases	Pulmonary atelectasis	Infection	Chylothorax	Incidence of complications (%)	χ^2	P
Control group	50	5	2	1	16%	4.000	0.046
Observation group	50	2	0	0	4%		

Table 6. Comparison of pain control between the two groups.

Group	Number of cases	Influence of pain on daily life	Satisfaction with methods of pain control or relief	Satisfaction with pain control education
Observation group	50	29.700 ± 3.649	48.640 ± 3.751	40.460 ± 3.765
Control group	50	31.660 ± 2.960	37.340 ± 5.787	33.380 ± 3.973
t		−2.950	11.585	9.146
P		0.004	0.000	0.000

Table 7. Comparison of discharge satisfaction between two groups of patients.

Grouping	Number of cases	Very dissatisfied	Dissatisfied	Satisfied	Relatively satisfied	Very satisfied	X^2	P value
Observation group	50	0	2	15	22	11	10.325	0.016
Control group	50	0	8	19	21	2		

3.6. Comparison of Discharge Satisfaction between Two Groups of Patients

The discharge satisfaction of the observation group was significantly higher than that of the control group, and the difference between the two groups was statistically significant (P < 0.05), as shown in **Table 7**.

4. Discussion

Pain is a sensory, emotional, cognitive and social pain experience related to tissue injury or potential tissue injury [20], which is the most common problem after lung cancer surgery. There are many factors that lead to pain in patients. The main factors are not only the pain caused by muscle tissue injury caused by surgery itself, but also the pain caused by continuous stimulation of pleura by closed thoracic drainage tube with respiratory movement [21]. Studies have shown that patients' fear can sensitize pain or lower pain threshold [22], which greatly increases the influence of pain on patients. Preoperative health education and psychological intervention can improve the mood of patients and their families, effectively avoid the occurrence of stress reaction during operation, ensure the smooth progress of operation and achieve the expected effect of operation [23]. The purpose of perioperative pain nursing is to relieve pain, improve their quality of life, provide basis for the formulation of individualized treatment plan after operation, and realize effective management and control of pain [24].

In the preoperative evaluation stage of this study, we should know the personality characteristics of different patients in advance, give targeted health psychological guidance and pain knowledge education, and invite family members, relatives and friends to provide emotional comfort for patients, which is helpful to reduce the psychological burden and fear of patients. After operation, pa-

tients' pain was evaluated by pain digital score scale (NRS), and non-drug nursing (music therapy, acupoint massage, a kind of traditional Chinese shadowboxing (tai chi chuan) and Baduanjin) was given priority, which made patients feel better subjectively and have a deeper understanding of pain nursing and control, which not only had a better effect on patients' recovery, but also promoted the good development of doctor-patient relationship. This study adopts diversified health education models, Fully mobilized the subjective initiative of patients, Let patients fully understand diseases and pains, Enable patients to actively cooperate and ask questions, so that nurses can truly understand patients' needs, give targeted care, actively deal with adverse reactions, improve patients' medication compliance, so as to better control pain symptoms [25], promote patients to get out of bed early after operation, conducive to lung expansion, shorten the time of lien chest tube, reduce postoperative complications and promote patients' rehabilitation. The pain scores of the observation group were lower than those of the control group at 6 h, 12 h, 24 h and 48 h after operation, reflecting that perioperative pain intervention can effectively reduce the pain degree of patients. The effect of postoperative pain on daily life in the observation group was lower than that in the control group, and the satisfaction of pain health education and pain control methods was higher than that in the control group, which indicated that the effect of perioperative pain intervention nursing was better than that of routine nursing, and the influence of postoperative pain on patients' body and quality of life was reduced. This study is a single-center control, with a small number of cases, which needs further discussion.

5. Conclusion

To sum up, perioperative pain nursing intervention can obviously alleviate patients' pain, promote patients to get out of bed early and conducive to lung expansion, shorten the time of lien chest tube, reduce postoperative complications and the impact of pain on daily life, help patients recover as soon as possible, and improve the satisfaction of patients for medical treatment.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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