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Original Article

Role of operating room clinical nursing during postoperative anesthetic period in the treatment of laryngeal cancer

Jinfeng Xu[1*], Xiaoqin Ren[2*], Changying Xu[3], Chunning Liu[4], Xinye Guo[1]

Departments of [1]Otolaryngology, [2]Anesthesiology, [3]Gastrointestinal Surgery, [4]Nursing, Dongying People's Hospital, Dongying, Shandong, China. [*]Equal contributors and co-first authors.

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Abstract: Objective: To study the effect of clinical nursing on patients' unhealthy emotions, intraoperative blood loss and complications during the postoperative anesthetic period in the treatment of laryngeal cancer (LC). Method: Ninety-eight LC patients in our hospital were collected as researched subjects, and all patients need resection surgery. Ninety-eight patients were randomly divided into the study group (n=49) and the control group (n=49) by random number table. Clinical pathway nursing was used in the study group, and routine nursing was used in the control group. The results of SDS scale, SAS scales, operation time and blood loss volume during operation were compared between the two groups separately after hospitalization, after the operation and before discharge. The complications during the postoperative anesthetic period were recorded, and nursing satisfaction was investigated before patients were discharged from the hospital. Two groups were followed up for 5 years, and 5-year prognosis and survival condition of the two groups were recorded. Results: There was no significant difference in operation time, 5-year prognosis survival condition and SDS and SAS scores after hospitalization between the two groups ($P > 0.050$). SAS and SDS scores after the operation and scores before discharge in the study group were significantly lower than control group ($P < 0.001$). In the control group, the scores of SDS and SAS were highest after the operation, and scores after hospitalization were lower than scores after operation, and scores were lowest before being discharged ($P < 0.001$). The blood loss volume during operation in the study group was significantly lower than control group ($P < 0.001$). The incidence of complications in the study group during the postoperative anesthetic period was significantly lower than control group ($P=0.027$). The nursing satisfaction of the study group was 91.84%, and it was significantly higher than 67.35% of the control group ($P=0.003$). Conclusion: Clinical pathway nursing can effectively reduce unhealthy emotions, blood loss volume and the incidence of complications during the postoperative anesthetic period. This has great potential for clinical application.

Keywords: Clinical pathway nursing, laryngeal cancer, unhealthy emotion, blood loss volume during operation, complications during postoperative anesthetic period

Introduction

Laryngeal cancer (LC) is a malignant tumor from epithelial tissue of laryngeal mucosa, and it is also a common malignant tumor in head and neck neoplasm [1]. LC is mainly divided into primary LC and secondary LC, and primary squamous cell carcinoma is the most common in clinic [2]. LC is more common in middle-aged and older men. The incidence rate is about 1.0~5.0% of whole body tumors [2]. According to statistics, the incidence of LC is about 7.85/100 thousand worldwide, and it ranks second to nasopharyngeal carcinoma in otorhinolaryngology tumors [3]. The incidence of LC has great regional differences. In some countries with developed heavy industry, the number of LC patients is 3 times more than other areas [4]. At present, surgical resection and local lymphadenectomy are the main treatment methods for LC. However, because of the special location of LC, the operation is very difficult. Besides, because of the wide range of resection, the trauma of patients is very great [5-7]. Usually, patients need a long time to recover with the tube, and they need to change breathing, diet, life and other habits after surgery [8]. Therefore, LC patients have great emotional changes in the course of treatment, and patients get psychological disorders easily [9].

Therefore, helping LC patients maintain a good mental outlook and improve treatment compliance, effects the course of treatment and is currently a major research hotspot in the clinic. With the deepening of research, more and more studies at home and abroad proved that improved nursing interventions can effectively improve psychological status of cancer patients [10-12]. However, there is still a lack of research support on surgical nursing of LC patients.

Clinical pathway nursing is a new nursing method undergoing medical system reform. It adheres to patient-centered, scientific, effective, standard and normative nursing management modes. All disciplines cooperate with patients to formulate the most appropriate, orderly and timely service plan, to provide nursing services with the highest quality, the shortest cycle and the lowest cost for patients [13]. At present, remarkable application results have been achieved in a number of cancer researches [14-16]. Therefore, we speculated that clinical pathway nursing has high application value for LC, and we carried out experiments to verify our conjecture, and to provide references and guidance for future clinical treatment of LC patients.

Materials and methods

General information

Ninety-eight LC patients who needed resection surgeries in our hospital were collected as research subjects, including 78 males and 20 females. The ages ranged from 49 to 70 years old, with an average age of (58.76 ± 10.52) years old. Ninety-eight patients were randomly divided into the study group (n=49) and the control group (n=49) by random number table. Clinical pathway nursing was used in the study group, and routine nursing was used in the control group. The experiment was approved by the ethics committee of Dongying People's Hospital. All patients signed the informed consent.

Inclusion and exclusion criteria

Inclusion criteria: The clinical manifestations were consistent with LC [17]; all cases were diagnosed as LC by biopsy in the Pathology Department of our hospital; all surgeries were performed by senior otolaryngologists of our hospital; datum of cases were complete; patients were willing to cooperate with medical staff in our hospital; patients' ages were between 30 to 70 years old. Exclusion criteria: Other cancer diseases; cardiovascular and cerebrovascular diseases; failure of vital organs; liver and kidney insufficiency; surgical contraindications; patients could not take care of themselves; three months before surgery radiotherapy or chemotherapy were performed; mental disorders; long-term bedrest; patients who transferred to our hospital.

Methods

Patients in both groups received laryngoscopic resection or partial laryngectomy under general anesthesia. The routine nursing of the control group included keeping the ward and operating room clean, real-time detection of patients' vital signs or pathological changes during surgery and after surgery, supervising and helping patients to take medicine after surgery, and regular cleaning of wounds. Clinical pathway nursing was added in the study group on the basis of routine nursing, and the following contents were included: 1. Clinical pathway nursing group was established. After consulting the data of previous patients and disease introduction, continuation of consult and discussion with doctors. The Clinical Pathway Nursing Handbook was formulated, and nursing operation was carried out according to the handbook. 2. After being hospitalized, patients' clinical data, disease severity and psychological status were collected. Related knowledge of disease and successful cases were introduced to patients in order to make patients confident with follow-up treatments. 3. Before the operation, nursing staff assisted patients to complete all examinations. Nursing staff introduced the purpose of each examination and the corresponding method and theory of operation. Nursing staff communicated with patients actively and timely to alleviated negative emotions of patients. Before the operation, patients were advised on fasting, and the function of the gastric tube and precautions were introduced to patients. 4. Patient's vital signs were monitored in real time on the day of operation. Nursing staff maintained the cleanliness and hygiene of the operating room. After surgery, nursing staff assisted patients to take a semi-recumbent position, to keep the gastric tube and drainage tube unblocked. Pain condition was evaluated after operation, and mild dis-

traction was carried out, or drug analgesia was used. 5. After surgery, nutritional status of patients was assessed. Dietary plan was formulated for patients. Dairy food was the main food, and vegetables, fruits and other vitamin foods were supplemented. The nature of sputum was evaluated, and the respiratory condition of patients was observed. Daily airway humidification treatment was carried out, to keep the ward clean and ventilated. Nursing staff guided and assisted patients to complete rehabilitation training after the operation. 6. Nursing staff guided and assisted patients and their family to complete removal and placement of the inner cannula, related disinfection treatments, strengthened the monitoring of the gastric canal to prevent it falling off, and eating and language rehabilitation training. 7. Patient's language and dietary function was evaluated. Patients and their families were advised on removal conditions of the nasal feeding tube. Water, dust and foreign bodies were strictly prohibited from entering the tracheostomy. Regular telephone follow-up was conducted, and patients were required to return to the hospital for review every month.

Outcome measures

Psychological status: Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) were used to assess psychological status. The full score was 100. The higher the score was, the worse the psychological status was. The patients were investigated separately before hospitalization, after operation and before being discharged. Surgery conditions included operation time and blood loss volume during the operation. Postoperative conditions: The complications during the postoperative anesthetic period were recorded, and the incidence of complications was calculated. The incidence of complications = the number of complications/the total number of complications × 100%. Nursing satisfaction: Anonymous scoring survey was conducted on all patients before leaving the hospital. The total score was 100. The survey included the satisfaction degree on nursing staff, nursing ability, benefits and so on. High satisfaction was more than 90 points, satisfaction was 80~90 points, needing further improvement was 60~79 points, and dissatisfaction was less than 60 points. Nursing satisfaction = (high satisfaction + satisfaction)/total number * 100%. Prognosis: All patients were followed for 5 years. Follow-up was carried out by telephone, letter, door-to-door follow-up and hospital review. The follow-up period ended when the patient was dead. The prognosis and 5-year survival condition of the two groups were recorded.

Statistical method

SPSS 24.0 statistical software (Shanghai Yuchuang Network Technology Co., LTD) was used to analyze and process the data. All graphics were drawn by Graphpad8 software (Shenzhen Tianruiqi Software Technology Co., Ltd.), and the results were checked twice. Counting data results were expressed in the form of rate, such as pathological type and tumor stage, and Chi square test was used for comparison between groups. Measurement data were expressed in the form of mean ± standard deviation, such as SDS and SAS scores, and T test was used for comparison between groups. Kaplan-Meier method was used to calculate the survival rate, and Log-rank test was used for comparison between groups. The difference was statistically significant when $P < 0.050$.

Results

Clinical data comparison

The age, course of disease, BMI, blood routine examination, gender, tumor type, histological type, tumor location, pathological stage, living environment, marital status and smoking status of patients were compared between the two groups. There was no significant difference ($P > 0.050$), and the clinical data of two groups were comparable (**Table 1**).

Psychological status comparison

There was no significant difference in SDS and SAS scores between the two groups after being hospitalized ($P > 0.050$). SAS and SDS scores in the study group were significantly lower than control group both after the operation and before being discharged ($P < 0.001$). In the study group, SDS and SAS scores were the highest after hospitalization. After the operation, scores were lower than scores after hospitalization, and scores were the lowest before being discharged ($P < 0.001$). In the control group, SDS and SAS scores were highest after the operation, and scores were higher than

Table 1. Comparison of clinical data [n (%)]

	Research group (n=49)	Control group (n=49)	t or χ^2	*P*
Age	59.07 ± 8.94	59.16 ± 9.07	0.049	0.961
Course of disease* (day)	6.87 ± 3.74	7.03 ± 3.55	0.217	0.829
BMI	28.72 ± 5.14	29.14 ± 6.01	0.372	0.711
Red blood cell ($\times10^{12}$/L)	4.15 ± 1.25	4.29 ± 1.09	0.591	0.556
White blood cell ($\times10^{9}$/L)	13.94 ± 4.08	13.28 ± 4.72	0.741	0.461
Platelet ($\times10^{9}$/L)	268.70 ± 49.83	272.83 ± 51.61	0.403	0.688
Gender			2.262	0.133
Male	36 (73.47)	42 (85.71)		
Female	13 (26.53)	7 (14.29)		
Tumor type			0.344	0.558
Primary	47 (95.92)	48 (97.96)		
Secondary	2 (4.08)	1 (2.04)		
Organization type			1.010	0.315
Squamous cell carcinoma	49 (100.00)	48 (97.96)		
Adenocarcinoma	0 (0.00)	1 (2.04)		
Tumor site			0.434	0.805
Supraglottic type	19 (38.78)	17 (34.69)		
Glottic type	16 (32.65)	15 (30.61)		
subglottic type	14 (28.57)	17 (34.69)		
Pathological staging			0.400	0.527
I~II	19 (38.78)	16 (32.65)		
III~IV	30 (61.22)	33 (67.35)		
Living Environment			0.299	0.585
Town	42 (85.71)	40 (81.63)		
Rural	7 (14.29)	9 (18.37)		
Marital status			1.897	0.168
Married	45 (91.84)	48 (97.96)		
Unmarried	4 (8.16)	1 (2.04)		
Smoking			1.010	0.315
Yes	48 (97.96)	49 (100.00)		
No	1 (2.04)	0 (0.00)		

Remarks: Course of disease * is the time from patient's LC clinical symptoms to being hospitalized.

scores after being hospitalized. SDS and SAS scores were the lowest before being discharged (P < 0.001) (**Figures 1** and **2**).

Comparison of operative conditions

The operation time of the study group was (117.86 ± 27.15) min, and the operation time of the control group was (121.25 ± 22.87). There was no significant difference between the two groups (P > 0.050). Blood loss volume during the operation in the study group was (1884.85 ± 204.85 ml), and it was significantly lower than (2289.85 ± 310.20 ml) of the control group, and P < 0.001 (**Figures 3** and **4**).

Postoperative comparison

In the study group, 4.08% of patients (2 cases) had vomiting, 4.08% of patients (2 cases) had arrhythmia, 4.08% of patients (2 cases) had hypothermia and shivering, and the incidence of complication was 12.24%. In the control group, 8.16% of patients (4 cases) had vomiting, 4.08% of patients (2 cases) had respiratory complications, 8.16% of patients (4 cases) had arrhythmia, 10.20% of patients (5 cases) had hypothermia and shivering, and the incidence of complication was 30.61%. The incidence of complication during the postoperative anesthetic period in the study group was significantly lower than the control group (P=0.027) (**Table 2**).

Comparison of nursing satisfaction

There was no significant difference in satisfaction and needing further improvement scores between the two groups (P ≥ 0.050). In the study group, 73.47% of patients (36 cases) graded high satisfaction, and it was significantly higher than 32.65% (16 cases) of the control group. In the study group, no patient graded dissatisfaction, and it was significantly lower than 10.20% (5 cases) of the control group. (P=0.022) The nursing satisfaction of the study group was 91.84%, and it was significantly higher than 67.35% of the control group (P=0.003) (**Table 3**).

Prognosis comparison

The prognosis of 94 patients was followed up. The follow-up success rate was 100%.

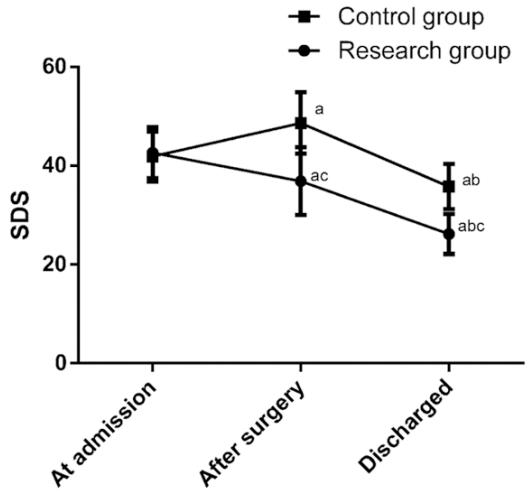

Figure 1. SDS score comparison of two groups. A SDS score comparison in the same group when patients admitted to hospital, $P < 0.001$; B. SDS score comparison in the same group after operation, $P < 0.001$; C. SDS score compared with control group, $P < 0.001$.

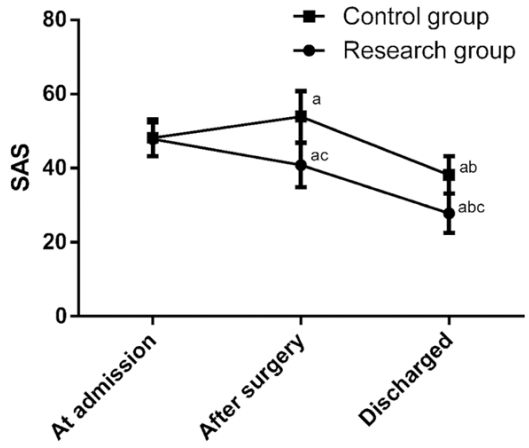

Figure 2. Comparison of SAS scores between two groups. A. SAS score comparison in the same group when patient admitted to hospital, $P < 0.001$; B. SAS score comparison in the same group after operation, $P < 0.001$; C. SAS score compared with control group, $P < 0.001$.

In the study group, the 1-year survival rate, 3-year survival rate and 5-year survival rate was 97.96%, 95.92% and 89.80%, respectively. In the control group, the 1-year survival rate, 3-year survival rate and 5-year survival rate was 95.92%, 87.76% and 75.51%, respectively. The 5-year total mortality rate of study group was 10.20%, and the 5-year total mortality rate of control group was 24.49%. There was no statistical difference ($P > 0.050$) (**Figure 5**).

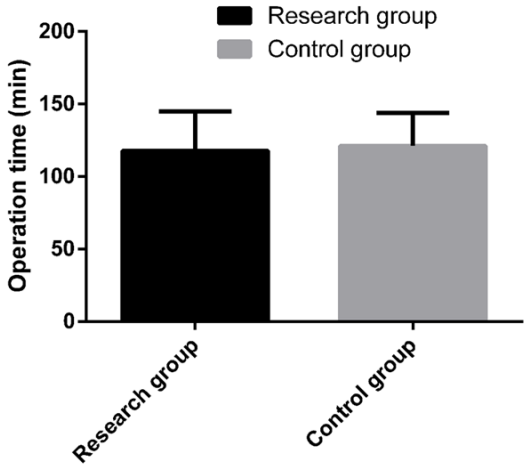

Figure 3. Comparison of operation time between two groups.

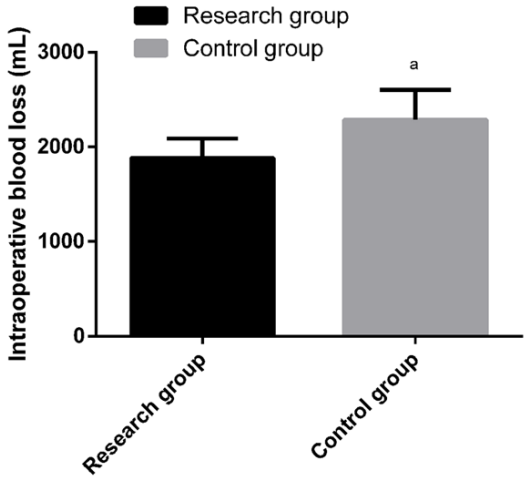

Figure 4. Comparison of blood loss volume during operation between two groups. A. Blood loss volume during operation compared with control group, $P < 0.001$.

Discussion

LC is a common malignant tumor that endangers human life and health, and the pathogenesis of LC is not fully clear. In the clinic, it is believed that the incidence of LC is related to smoking, excessive drinking, environmental pollution and radioactive substances [18, 19]. The main clinical manifestations of LC are hoarseness and throat body foreign sensation. Patients often consider manifestations as a common cold or inflammation due to lack of medical knowledge. Wrong treatment and wrong medication can accelerate the condition, and degree of deterioration is greatly increased [20]. Therefore, for most patients, the tumor

Table 2. Comparison of complications during postoperative anesthetic period [n (%)]

	Research group (n=49)	Control group (n=49)	χ^2	*P*
Vomiting	2 (4.08)	4 (8.16)		
Respiratory complications	0 (0.00)	2 (4.08)		
Arrhythmia	2 (4.08)	4 (8.16)		
Chill	2 (4.08)	5 (10.20)		
Incidence (%)	12.24	30.61	4.909	0.027

Table 3. Comparison of nursing satisfaction between two groups [n (%)]

	Research group (n=49)	Control group (n=49)	χ^2	P
High satisfaction	36 (73.47)	16 (32.65)	16.392	< 0.001
Satisfaction	9 (18.37)	17 (34.69)	3.350	0.067
Needs improvement	4 (8.16)	11 (22.45)	3.857	0.050
Dissatisfaction	0 (0.00)	5 (10.20)	5.269	0.022
Nursing satisfaction (%)	91.84	67.35	9.046	0.003

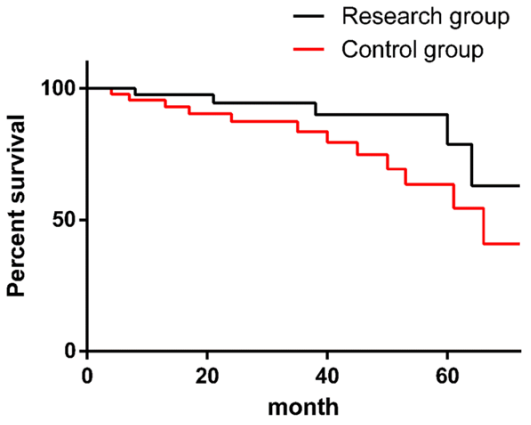

Figure 5. 5-year prognosis survival curve of two groups. The 5-year prognosis mortality rate of study group was 10.20%, and 5-year prognosis mortality rate of control group was 24.49%. There was no significant difference (P > 0.050).

has developed to the middle and late stages once it is diagnosed. At this time, the difficulty of treatment greatly increases, and the prognosis of rehabilitation is seriously affected [21]. With the accumulation and development of medical technology and experience in recent years, LC surgery has already achieved better resection effects. However, the prognosis differences caused by emotional changes during treatment has been unanimously agreed at home and abroad. Therefore, many studies suggested that nursing intervention can improve the treatment efficacy and prognosis of LC patients. For example, Smith et al [22] showed that the rehabilitation of head and neck tumors was influenced by nursing interventions. Kang et al [23] improved the prognosis of patients through nutritional intervention. But these studies generally have high limitations, and the investigation items are only postoperative investigations, and accurate clinical advice could not be provided. At present, the application of clinical pathway nursing in LC has not been proven. Through rigorous inclusion and exclusion criteria, advanced statistical software and complete experimental cycles, this paper verified the value of clinical pathway nursing in the treatment of LC, and it has higher representativeness, comprehensiveness and effectiveness.

This experiment showed that the blood loss volume, psychological state and nursing satisfaction of the study group were significantly better than control group. It suggested that clinical pathway nursing has high application value in LC patients. The result was also consistent with the experimental conclusions of applying clinical pathway nursing to breast cancer of Runowicz et al [24], and it corroborated the results of this experiment. The reasons for the difference between the two groups are speculated as follows: because of unknown of disease, fear of surgery and the pain of postoperative rehabilitation, patients generally have negative emotions such as anxiety or anger [25]; while clinical pathway nursing requires nursing staff to communicate with patients actively and to teach patients related knowledge of diseases and operation, so patients have preliminary understanding of their own diseases; patients can understand the situation of the rehabilitation process, and negative situations of patients can be reduced in the treatment process, and secondary damage due to lack of pathological knowledge can be avoided. Through effective psychological counseling and communication, patients are full of confidence in their rehabilitation. Then the reliability on nursing staff improves, and treatment compliance can be improved significantly. Clinical

pathway nursing can make the nursing process standardized and routinized. So omissions can be avoided, and rehabilitation nursing is targeted and purposeful. Clinical pathway nursing can effectively reduce the workload of medical staff, and it also changes the role of patients from passive acceptance to active participation in rehabilitation. The doctor-patient relationship was improved, so patients' evaluation on nursing satisfaction was increased significantly. In the control group, SDS and SAS scores after the operation were higher than scores after being hospitalized, this is possibly because the wound pain made patient's psychological burden greater. In the study group, SDS and SAS scores decreased steadily after being hospitalized, and it further proved that clinical pathway nursing can effectively regulate the psychological state of LC patients. There were no statistical differences between the two groups in operation time and prognosis survival condition, and it suggested that the surgery achieved stable and significant therapeutic effects. However, the prognosis survival condition of the control group was worse than the study group, and it may be due to the limitation of a smaller number of research subjects. We will expand the sample size of research subjects as soon as possible to verify the hypothesis.

This experiment compared the value of clinical pathway nursing and routine nursing in LC. Because of the limited experimental conditions, there were still some shortcomings. For example, the base of the research subjects is small, so statistical analysis of large data cannot be carried out. Besides, research subjects were relatively single, so different manifestations in different subjects could not be excluded. At present, the best nursing intervention for LC patients is still controversial. In this study, only routine nursing was used as a control. In future experiments, we will continue to expand the number of subjects and experimental control range. We will further explore the impact of clinical pathway nursing on LC patients, to obtain better experimental results.

In conclusion, clinical pathway nursing can effectively improve adverse emotions in LC patients, and it also reduces blood loss volume during operation and complications during the postoperative anesthetic period. Clinical pathway nursing has great potential for clinical application.

Disclosure of conflict of interest

None.

Address correspondence to: Xinye Guo, Department of Otolaryngology, Dongying People's Hospital, No. 317, Nan Yi Road, Dongying 257091, Shandong, China. Tel: +86-13884910929; E-mail: xinyeguoyx@163.com

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