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Review Article

The effect of extended nursing on postoperative pain in patients with esophageal carcinoma and their quality of after discharge

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Abstract: Objective: To explore the influence of extended nursing on the postoperative pain and quality of life of patients with esophageal carcinoma (ESCA). Methods: Altogether 136 ESCA patients admitted to Wuhan Fourth Hospital from July 2016 to December 2017 were enrolled, of which 70 patients were nursed under a routine nursing mode as a routine group, and the rest were nursed under an extended nursing mode based on routine nursing as a research group. The pain situations, nutritional statuses, postoperative complications, quality of life, psychological state, nursing compliance, and nursing satisfaction of the two groups were compared. Results: After one week and three weeks of nursing, the visual analog scale (VAS) scores of the research group were lower than they were in the routine group ($P<0.05$). After the nursing, the nutritional status of the research group was much better than it was in the routine group, and the incidence of complications in the research group was dramatically lower than it was in the routine group (both $P<0.05$). In addition, before the nursing, the two groups had no big differences in their body function, emotional function, social function, cognition function scores or their self-rating anxiety scale (SAS) and self-rating depression scale (SDS) scores (all $P>0.05$), but after three weeks of nursing, both groups had higher function scores and lower SAS and SDS scores (all $P<0.05$), and the research group had higher function scores and lower SAS and SDS scores than the routine group (all $P<0.05$). Moreover, the nursing compliance and nursing satisfaction of the research group were significantly better than they were in the routine group (both $P<0.05$). Conclusion: Extended nursing can effectively relieve the postoperative pain of ESCA patients, improve their nutritional status, and reduce their incidences of postoperative complications, thus improving their quality of life and accelerating their postoperative rehabilitation.

Keywords: Extended nursing, esophageal carcinoma, postoperative pain, quality of life, effect

Introduction

Esophageal carcinoma (ESCA) is a familiar clinical malignant digestive tract cancer with a relatively complicated pathogenesis. It is generally believed that the incidence of ESCA is strongly linked to diet and lifestyle, and it is reported that that the incidence of ESCA is on the rise. When ESCA is out of control, it damages the tissues of multiple organs in patients and greatly threatens patients' lives [1, 2]. Early ESCA is typically characterized by progressive dysphagia. Initially, ESCA patients have difficulty in swallowing dry foods, and the disease worsens, they become unable to swallow semi-liquid food and can only swallow water. Finally, they suffer from difficulty swallowing saliva. Subject to a long-term eating obstruction, the patients cannot intake enough nutrition to maintain the metabolic balance in the body affected by the cancer, and they gradually suffer from emaciation and dehydration, which poses adverse effects on their recovery [3, 4]. At present, surgical treatment is the first choice for ESCA patients. However, because the ESCA operation process is complicated, and it causes great trauma to patients' lower esophageal sphincters and esophageal hiatus, those undergoing

the operation may suffer from problems such as gastrointestinal dysfunction, overeating, poor nutrition, and postoperative traumatic pain due to the side effects of the anesthetic drugs, which compromise their postoperative quality of life [5-7]. Furthermore, ESCA patients undergo a gradual decline in various physical functions, so they are prone to suffer from repeated injury brought about by the corresponding complications after the operation [8].

Therefore, reasonable and scientific postoperative nursing measures are of great significance to patient recovery. Extended nursing is a new high-efficiency nursing mode that represents the humanistic care direction of modern nursing, under which community services are expanded through a series of nursing and medical care measures to ensure that patients under different nursing environments can enjoy continuous nursing services. Such a nursing mode is usually used for patients with chronic diseases or those with postoperative rehabilitation needs [9]. This study probed the application of extended nursing-related measures in postoperative ESCA patients and recorded the relief of the patients' pain and the improvement of their quality of life.

Materials and methods

General data

A total of 136 ESCA patients admitted to Wuhan Fourth Hospital from July 2016 to December 2017 were enrolled, of which 70 patients were nursed under a routine nursing mode as a routine group, and the rest were nursed under an extended nursing mode based on routine nursing as a research group. The surgery method for all the patients was an esophageal cancer radical operation. The patients consisted of 73 males and 63 females, with a mean age of 55.56±12.17 years and a mean body mass index (BMI) of 19.47±1.46 (kg/m^2).

The inclusion criteria of the patients were as follows: Patients diagnosed with ESCA based on pathology and gastroscopy [10], and patients who voluntarily participated in the nursing and treatment and signed informed consent forms for the nursing and treatment plan process. The exclusion criteria were as follows: Patients who suffer from recurrent ESCA, patients with respiratory disorders, circulatory disturbances or nervous system disorders, patients with contraindications to radiotherapy or chemotherapy, patients without detailed case data, and patients who had received thoracic and abdominal operations.

Nursing methods

Routine nursing intervention methods: The patients in the routine group were taught health and treatment-related knowledge and dietary and exercise knowledge before being discharged, and they were also asked to undergo regular reexaminations. After discharge, each patient's bedside nurse arranged to follow up with the patient and summarize his/her complaints and understand the detailed basic information of him/her regarding their incision, medication, diet, and other concerns, and the nurse also arranged to give appropriate health guidance to the patient according to his/her actual physical conditions. Meantime, the follow-up after discharge was recorded.

Extended nursing intervention methods: The patients in the research group were nursed under the extended nursing intervention mode based on telephone follow-up of the routine group. The nursing intervention was as follows: (1) Extended nursing team establishment. An extended nursing team was established with 2 doctors, 1 head nurse or supervisor nurse, 1 medical consultant, and 3 nurses from the department, and the doctors and head nurse or supervisor nurse jointly organized the study and training of nursing skills for the team members to ensure efficient nursing. (2) Distribution of health education materials. According to the physical function of the ESCA patients after the operation, the important aspects requiring nursing intervention were analyzed and taken care of, and the details and matters needing attention were dealt with in the department. The responsible medical staff were asked to formulate a plan about diet collocation and the quantity and discomfort symptom treatment for the patients, and the responsible nursing staff arranged to distribute plan materials to the patients three days before their discharge. The nursing staff also arranged to explain the materials to the patients and their family members step by step as much as possible, so as to obtain their active cooperation

and understanding and avoid an intensive explanation of the materials to them on the day of discharge. (3) Follow-up plan after discharge. The responsible nurse staff arranged to understand and record the basic patient information during their admission and to acquire their communication information, and they also to inform the patients of the telephone follow-up time, the telephone number for follow-up, and the follow-up staff in advance to obtain the patients' trust, permission, and support. The follow-up was carried out once a week during the first month after discharge and twice during the second month after discharge. During the follow-up, relevant knowledge was provided purposefully and scientifically to guide the patients and answer their questions. Follow-up files were established for the reference of the responsible doctors, and the fixed telephone number of the department was provided so that the patients could make timely telephone consultations in case of discomfort. (4) Establishment of a network connection platform. WeChat Official Accounts and WeChat groups were established to address matters needing attention and health knowledge to relevant patients from time to time, and online appointment and consultation channels for diagnosis were established. (5) Expert clinic. Doctors with the title of deputy director or above were arranged to provide outpatient service to the patients in a fixed period of time, and the outpatient service schedule of the arranged expert or bedside doctor and relevant online appointment methods were informed to the patients before their discharge. (6) Development of a family-visiting plan. A family-visiting plan was developed for the special patients, including those leaving the hospital with a nutrient canal, those leaving the hospital under family-based enteral nutrition therapy, and those suffering from travel difficulties. During the visit, a comprehensive analysis was carried out on the patients in terms of their health, diet collocation, and incision healing, and a face-to-face detailed communication was arranged to understand the patients' mastering of their rehabilitation knowledge, to correct and handle the patients' adverse life nursing problems, to guide the patients and their family members to learn cancer pain-related knowledge, and to tell their family members the importance of providing adequate psychological support to the patients.

Observation standards

(1) The postoperative pain of the ESCA patients during the nursing was analyzed using the visual analog scale (VAS). A 10 cm-long Vernier caliper with 10 scales from 0 to 10 was given to the patients, and they were asked to mark the caliper according to their pain. A higher score indicated more severe pain [11]. (2) The nutritional status of the patients nursed after operation was evaluated using the subjective global assessment (SGA), and the nutritional status was divided into three nutritional levels using a 24-point system with 12 points and 17 points for division. The nutritional levels covered good nutrition, mild/moderate malnutrition, and severe malnutrition [12]. (3) According to the follow-up data, the complication rates from the surgical treatment in the two groups after discharge were analyzed and compared. (4) The EORTC Quality of Life Questionnaire (QLQ-C30) was applied to evaluate the patients' quality of life [13], and a higher score indicated a better quality of life. (5) The self-rating anxiety scale (SAS) and the self-rating depression scale (SDS) were employed to score the patients' anxiety and depression, and higher scores indicated a better psychological state [14]. (6) The compliance scale and nursing satisfaction scale developed by Wuhan Fourth Hospital were utilized to analyze and compare the compliance and nursing satisfaction of the two groups after the operations.

Statistical analysis

The research data were statistically analyzed using SPSS 19.0. The measurement data were expressed as the mean ± standard deviation, and they were analyzed using t tests. The enumeration data were expressed as n or %, and they were analyzed using χ^2 tests. $P<0.05$ indicated a significant difference.

Results

Comparison of general clinical data

There were no significant differences in terms sex, ESCA sites, or pathological type among the patients grouped under the different nursing modes ($P>0.05$) **Table 1**.

Table 1. Comparison of the general data among the ESCA patients

Item	The routine group (n=70)	The research group (n=66)	t/X^2	*P*-value
Gender (case)			0.322	0.570
Male	39 (55.71)	34 (51.52)		
Female	31 (44.29)	32 (48.48)		
Age (Y)	55.96±12.23	55.34±12.11	1.663	0.097
BMI (kg/m^2)	19.42±1.45	19.56±1.48	0.557	0.578
Education level (n)			0.023	0.880
With senior high school diploma or below	23 (32.86)	21 (31.82)		
With junior college diploma or above	47 (67.14)	45 (68.18)		
ESCA site (n)			0.611	0.737
Lower esophagus	34 (48.57)	29 (43.94)		
Middle esophagus	24 (34.29)	26 (39.39)		
Lower-middle esophagus	12 (17.14)	11 (16.67)		
Pathological stage (n)			0.042	0.979
Squamous cell carcinoma	36 (51.43)	34 (51.52)		
Adenocarcinoma	23 (32.86)	22 (33.33)		
Undifferentiated carcinoma	11 (15.71)	10 (15.15)		
Staging (cases)			0.199	0.655
Stage I-II	25 (35.71)	22 (33.33)		
Stage III-IV	45 (64.29)	44 (66.67)		

Table 2. Comparison of the degrees of pain in the two groups during the nursing

Group	The routine group (n=70)	The research group (n=66)	t	*P*-value
Before the nursing	6.35±2.25	6.42±2.23	0.182	0.856
After one week of nursing	5.47±1.03	4.67±0.93	4.745	<0.001
After three weeks of nursing	4.56±0.92	3.12±0.91	9.171	<0.001

Table 3. The nutritional status of the two groups after the nursing [n (%)]

Group	The routine group (n=70)	The research group (n=66)	X^2	*P*-value
Severe malnutrition	13 (18.57)	2 (3.03)	-	-
Mild/moderate malnutrition	27 (38.57)	12 (18.18)	-	-
Good nutrition	30 (42.86)	52 (78.79)	27.241	<0.001

Table 4. Comparison of the postoperative complications between the two groups [n (%)]

Group	The routine group (n=70)	The research group (n=66)	X^2	*P*-value
Functional delayed gastric emptying	6 (8.57)	2 (3.03)	-	-
Reflux esophagitis	5 (7.14)	3 (4.55)	-	-
Infection	6 (8.57)	4 (6.06)	-	-
Anastomotic stricture	3 (4.29)	2 (3.03)	-	-
Severe diarrhea	4 (5.71)	1 (1.52)	-	-
Incidence of complications	24 (34.29)	12 (18.18)	6.653	0.010

Comparison of the degree of pain in the two groups during the nursing

Before the nursing, the VAS scores of the two groups were basically the same (P>0.05), but after one week and three weeks of nursing, the VAS score of the research group was lower than the score of the routine group (P< 0.05) **Table 2**.

Nutritional status of the two groups after the nursing

After the nursing, the good nutrition rate of the patients in the study group (78.79%) was significantly better than the rate of the patients in the routine group (42.86%) (P<0.05) **Table 3**.

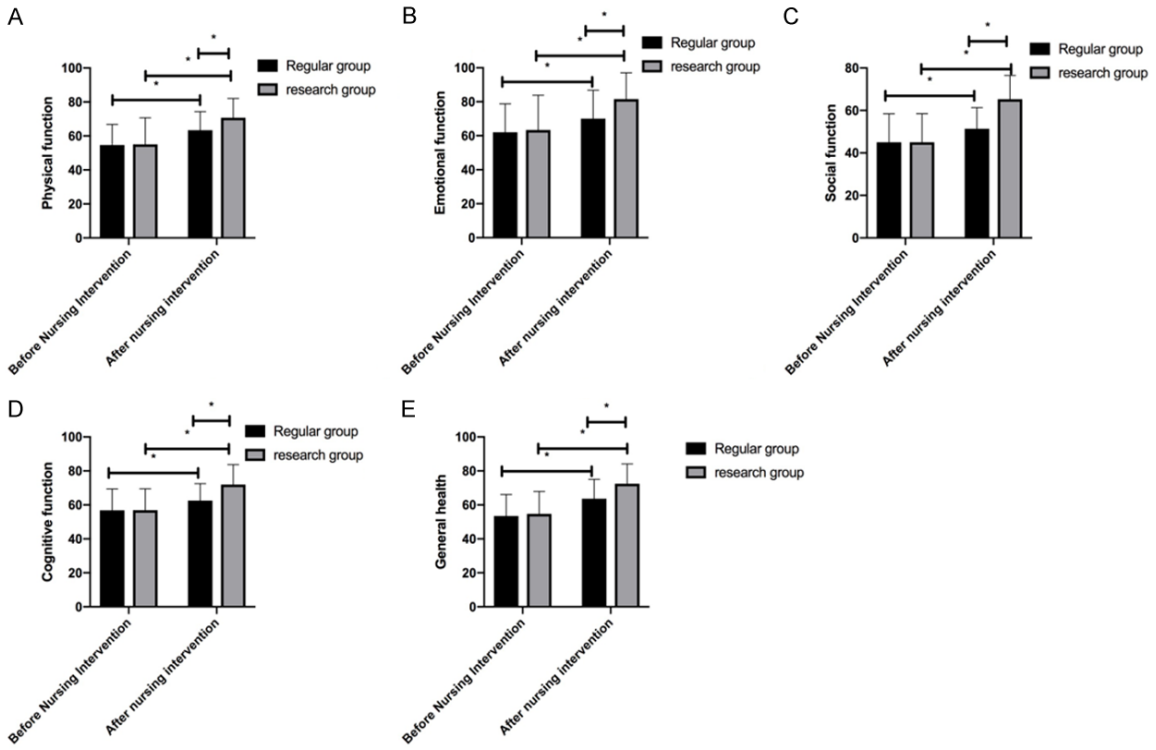

Figure 1. Differences in the quality of life indexes between the two groups before the nursing and after three weeks of nursing. A. Before the nursing, the two groups were not dramatically different in their body function scores, but after three weeks of the nursing, both groups got higher body function scores, and the scores in the research group were dramatically higher than the scores in the routine group. B. Before the nursing, the two groups were not dramatically different in their emotional function scores, but after three weeks of nursing, both groups got higher emotional function scores, and the scores in the research group were dramatically higher than the scores in the routine group. C. Before the nursing, the two groups were not dramatically different in their social function scores, but after three weeks of nursing, both groups got higher social function scores, and the scores of the research group were dramatically higher than the scores in the routine group. D. Before the nursing, the two groups were not dramatically different in their cognitive function scores, but after three weeks of nursing, both groups got higher cognitive function scores, and the score of the research group was dramatically higher than the score of the routine group. E. There was no significant difference in the overall health scores of the two groups before nursing. After 3 weeks of nursing, the overall health scores of the two groups were higher than before the nursing, and the overall health status of the study group was significantly higher than that of the conventional group. Note: * indicates P<0.05.

Comparison of the postoperative complications in the two groups

After the nursing intervention, the incidence of complications in the study group (18.18%) was significantly lower than that the incidence in the routine group (34.29%) (P<0.05) **Table 4**.

Differences in the quality of life indexes between the two groups before nursing and after three weeks of nursing

Before the nursing, the two groups had no differences in terms of their body function, emotional function, social function, or cognition function scores (all P>0.05), but after three weeks of nursing, both groups got higher scores in those aspects, and the total score of the research group was higher than the total score in the routine group (P<0.05) **Figure 1**.

Comparison of the psychological state scores in the two groups before the nursing and after three weeks of nursing

Before the nursing, the two groups had no big differences in their SAS and SDS scores, but after three weeks of nursing (both P> 0.05), both groups got lower scores in the two scales, and the scores of the research group were lower than the routine group's scores (both P<0.05) **Figure 2**.

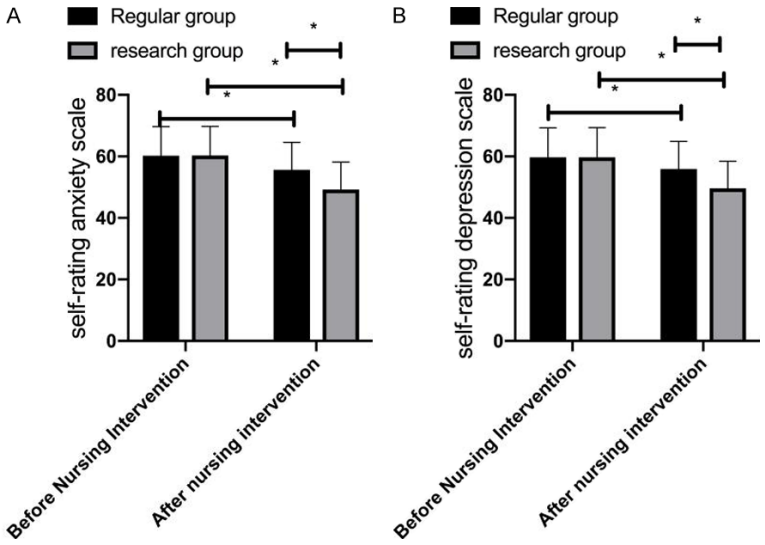

Figure 2. Comparison of psychological state scores in the two groups before the nursing and after three weeks of nursing. A. Before the nursing, the two groups were not dramatically different in their SAS scores, but after three weeks of the nursing, both groups got lower SAS scores, and the score in the research group was dramatically lower than the score in the routine group. B. Before the nursing, the two groups were not dramatically different in their SDS scores, but after three weeks of nursing, both groups got lower SDS scores, and the research group's score was dramatically lower than the routine group's score. Note: * indicates P<0.05.

Table 5. Comparison of the nursing compliance [n (%)]

Group	The routine group (n=70)	The research group (n=66)	X^2	*P*-value
Non-compliant	13 (18.57)	2 (3.03)	-	-
Partially compliant	22 (31.43)	13 (19.70)	-	-
Fully compliant	35 (50.00)	51 (77.27)	-	-
Compliance	57 (81.43)	64 (96.97)	13.071	<0.001

Table 6. Comparison of the nursing satisfaction [n (%)]

Group	The routine group (n=70)	The research group (n=66)	X^2	*P*-value
Dissatisfied	14 (20.00)	4 (6.06)	-	-
Basically satisfied	23 (32.86)	12 (18.18)	-	-
Very satisfied	33 (47.14)	50 (75.76)	-	-
Overall satisfaction	56 (80.00)	62 (93.94)	8.665	0.003

Comparison of the nursing compliance

The nursing compliance of the study group (96.97%) was significantly higher than the nursing compliance of the routine group (81.43%) (P<0.05) **Table 5**.

Comparison of the nursing satisfaction

The total nursing satisfaction of the study group (93.94%) was significantly better than that of the routine group (80.00%) (P<0.05) **Table 6**.

Discussion

ESCA is a digestive tract cancer caused by adenocarcinoma that develops under the combined action of many pathogenic factors. The symptoms of the cancer during its development and progression are insidious, causing a late diagnosis and a high mortality. At present, it ranks fifth among all cancers in terms of mortality [15]. Because of the particular location of the ESCA lesions, progressive tumor compression and invasion can give rise to symptoms such as eating obstructions and dyspnea, greatly affecting the patients' normal physiological activities [16, 17]. At present, most ESCA patients are treated surgically, and some studies show that endoscopic or surgical treatment can effectively prolong the survival time of patients with early ESCA [18]. However, surgical treatments may bring about wounds of different severities in ESCA patients and may increase their infection rates and complications, causing damage to them again [19]. The routine nursing mode is usually formalized without comprehensive nursing content, under which the diet plan implementation and nutritional status of the patients are usually not continuously followed up, and the patients' demands cannot be responded to in time after their discharge, hindering the patients' recovery after their operations. Therefore, the selected postoperative nursing intervention scheme indirectly affects the recovery and efficacy of the ESCA patients after the operation. In order to improve the nursing quality and reduce the conflicts and disputes between nurses and patients, this study applied extended nursing to the ESCA patients

after their operations and analyzed and recorded the effect of extended nursing on improving the relevant indicators.

In this study, the ESCA patients pain under different nursing modes in different nursing periods was analyzed, and it turned out that after one week and three weeks of nursing, the VAS scores of the research group were lower than those of the routine group. Commonly, ESCA patients will suffer from pain after the operation, and they usually suffer from infection caused by touching the incision due to unbearable pain, which delays the incision healing and recovery [20]. One study mentioned that under the extended nursing mode, the nursing staff strengthened wound treatment and treated the patients with the appropriate amount of drugs for analgesia according to their wound recovery and pain, and they also guided the patients to take advantage of exercise relaxation and music distraction, thus lowering their somatosensory pain [21]. It implied that extended nursing may relieve the postoperative pain of ESCA patients by the timely treatment of wounds and the psychological emotions of the patients. Moreover, in this study, the number of patients suffering from complications in the research group after nursing intervention was dramatically less than it was in the routine group after the nursing intervention, which may be related to the proper nursing intervention on the wounds under the extended nursing. The operations on the ESCA patients usually damages the mucosal tissues due to the improper use of instruments and improper operations and brings restrictions on the body's digestive system function [22]. At present, postoperative nutrition has become a major focus of postoperative nursing for ESCA patients. In this study, we analyzed the nutritional status of the two groups, finding that the nutritional status of the research group was significantly better than it was in the routine group. Under extended nursing, the nursing staff are arranged to teach patients about diet management and treatment methods, and to strengthen the guidance about the scientific diet during the return visit to correct the patients' dietary habits. In addition, the staff are also arranged to emphatically advise the patients leaving the hospital with a nutrient canal enteral nutrition on the infusion process and any matters needing attention [23]. This implies that intensive nursing on the nutritional status of the patients after discharge under the extended nursing mode strongly contributes to the recovery of the patients' postoperative nutritional status. From the quality of life score results in this study, it can be seen that pain alleviation and nutritional status improvement can directly and significantly improve the postoperative quality of life of the patients. We further analyzed the psychological state changes and the nursing cooperation and the satisfaction of the patients undergoing postoperative nursing interventions, finding that after three weeks of nursing, the SAS and SDS scores of the research group were lower than those of the routine group, and the nursing cooperation and satisfaction of the research group were significantly better than they were in the routine group. Extended nursing can help the patients dissipate negative emotions such as nervousness and anxiety, because under extended nursing, a responsible nurse is arranged to encourage the patients to express the emotions they want to express, strengthen the patients' trust in the nursing work and their ability to regulate emotions, to help them alleviate the psychological pressure from long-term medication, and instruct them to get enough sleep [24]. Based on the above, it can be verified that extended nursing can lower the rate of poor relationships between nurses and patients through a series of psychological adjustment operations.

To sum up, extended nursing can effectively relieve the postoperative pain of ESCA patients, improve their nutritional status, and reduce their incidence of postoperative complications, thus improving their quality of life and accelerating their postoperative rehabilitation. However, in this study, the understanding of the reasons for the influence of pain is insufficient, and the postoperative pain in ESCA patients is usually eased with analgesic drugs, but how to ease their postoperative pain under a nursing mode still requires further exploration. We will take it as one of our study directions to better relive the ESCA patients' pain and adjust their psychological states after surgery.

Disclosure of conflict of interest

None.

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