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Original Article

Effect of the multi-disciplinary teamwork on postoperative recovery and complications of elderly patients after thoracoscopic-lapacoscopic esophagectomy

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Abstract: Objective: This study was designed to analyze the effect of the multi-disciplinary teamwork (MDT) in nursing elderly patients with esophageal cancer after thoracoscopic-lapacoscopic esophagectomy (TLE). Methods: 72 elderly patients clinically diagnosed with esophageal cancer in our hospital were included as the study objects for retrospective analysis of clinical materials, and they were divided into 2 groups based on the timing of admission. The control group (n=36) was routinely nursed, while the observation group (n=36) was applied with a MDT. The two groups were compared in postoperative recovery, nutritional status and incidences of complications. Results: (1) The first time of getting out of the bed, urinary catheter indwelling time and postoperative LOS in the observation group were 16.54±3.92 h, 92.46±35.19 h and 13.52±3.29 d, while those of in the control group were 35.64±7.81 h, 125.43±46.90 h and 17.63±4.21 d, (P<0.05). (2) The observation group demonstrated a postoperative incidence of complications of 13.89%, while that of the control group was 36.11% (P<0.05). (3) For SGA scores 10 d and 1 month after the surgery, both groups showed a significant intragroup reduction as compared with the data 1 d before the surgery (P<0.05), and the SGA scores in the observation group was significantly lower than that of the control group (P<0.05). (4) The observation group attained a pain intensity score obviously lower than that of the control group at 2 d, 3 d, 4 d and 5 d after the surgery, and 91.67% of its patients were satisfied with the nursing, which was significantly higher than the control group reporting a satisfaction percentage of 72.22% (P<0.05). Conclusion: The MDT has demonstrated its satisfactory application value by making contributions to the alleviated postoperative pain intensity and complications, and accelerated postoperative recovery in elderly patients who received a TLE.

Keywords: Esophageal cancer in elderly patients, TLE, MDT, postoperative recovery, complications

Introduction

In a worldwide range, developing countries have recorded an incidence of esophageal cancer considerably higher than that of the developed countries due to dieting conditions and living environment [1, 2]. Esophageal cancer is relatively rare in people under 45 years of age, and the incidence of esophageal cancer increases with age, with more than 80% of people over 80 years old [3, 4].

The underlying reasons of esophageal cancer mostly in the elderly population include deteriorated visceral organs, long history of heavy smoking which results in poor pulmonary functions [5], progressive dysphagia in some patients who have difficulties in taking food, leading to insufficient intake of nutrients, which further weakens immunity and gives rise to anaemia and malnutrition syndromes [6, 7]. Surgery is always an effective option for patients with esophageal cancer in early and middle stages. A thoracoscopic-lapacoscopic esophagectomy (TLE) achieves cancer-free survival [8]. However, the conspicuous operation wounds, poor tolerance of patients to surgeries and stress due to anesthesia and surgeries

may affect their postoperative recovery [9], and make active cooperation with nursing necessary. Multi-disciplinary teamwork (MDT) is defined as the process of nursing intervention with contributions from experts of different disciplines to provide patients with comprehensive and high-quality interventions and guarantees for a successful surgery and rapid postoperative recovery.

The present study specifically analyzed the promotions of MDT-guided surgical nursing in elderly patients with esophageal cancer after a TLE via intergroup comparisons, thus to provide references and guides for the implementation of nursing in elderly patients with esophageal cancer after a TLE.

Materials and methods

Materials

72 elderly patients clinically diagnosed with esophageal cancer in our hospital were included as the study objects for retrospective analysis of clinical materials, and they were and divided into 2 groups based on the timing of admission. The controls (n=36) aged between 60 and 89, while the observations (n=36) were between 62 and 90. (1) Inclusion criteria: patients who were over 60 years old, who had no record of disorder of consciousness, who were diagnosed according to diagnosis criteria of esophageal cancer [10], clinically grouped into the early or middle stages [11], and admitted to the Department of Thoracic Surgery for a LTE were included in this study. An informed consent has been provided either by the patients themselves or their guardians, and the study was approved by the ethics committee of the Nanfang Hospital, Southern Medical University. (2) Exclusion criteria: patients who were expecting palliative resection to treat esophageal cancer or laparoscopic jejunostomy, or patients who were transferred to thoracotomy or extended esophagectomy in the process of TLE, or patients with distant metastasis of cancer cells at the advanced stage, or patients who were not tolerable enough to undergo the surgery were excluded.

Methods

The controls were routinely nursed in terms of health propaganda and education, respiratory tract management, pipeline management, and interventions in psychology and dieting.

The observation group adopted a MDT in surgical nursing by establishment of a surgical team consisting of 1 head nurse and 1 responsible team leader of ICU from the Department of Thoracic Surgery, 2 responsible team leaders of wards, 1 responsible team leader of the Psychiatric Department, 1 professional nurse of wounds, 1 professional nurse of pains, and 1 professional nurse of respiratory therapy. The details are as follows:

Concentrated health propaganda and education: Patients were organized to watch videos which were prepared in advance and in simple words to make sure the elderly patients can understand the contents to the extent of their knowledge. Key points in the videos, such as prohibition of food and water before surgery, effective coughing, pipeline management and postoperative early activities, were emphasized in PowerPoints. Patients or their family members were encouraged for questions or discussions to reduce passive inculcation and enhance the active participation of patients.

Psychological nursing: Psychological intervention and guiding to elderly patients are important because they, at an advanced age, have little knowledge about the disease, its treatment and the hospital life, and are more sensitive to a strange environment than other age groups. One day before the surgery, a bedside visit was arranged to evaluate patients' psychological status and any unhealthy mood via communication with them or their family members. Significant unhealthy moods, if any, were analyzed by the team members to find out their causes, based on which, patients were guided using proper psychological techniques to maintain a stable mood before surgery.

Well preoperative preparation: Patients were provided with semiliquid diets and administered with enteral nutrition orally on the day when they were hospitalized, polyethylene glycol electrolyte orally on the day before surgery and 500 ml 5% glucose solution by intravenous drip 2 h before surgery. Also before surgery, they were prohibited for water 6 h and food 8 h before surgery, and received multimodal pain management.

Postoperative nutritional nursing: Body weight and height of the patients were measured every 3 days after surgery, and changes in their BMI were calculated and recorded. Routine blood tests and monitoring on liver and kidney functions were performed every 2 days. Before the first diet after the surgery, patients were educated to take slagless or liquid food by frequent smaller meals before they adapted to normal diets. It was prohibited for lying down within half an hour after intake. In case of any obvious changes in the nutritional indices of patients, nurses actively communicated with nutritionists to formulate more targeted nutritional intervention plans for patients.

Postoperative skin nursing: Elderly patients are more prone to skin injury as their skin resistance is severely weakened and as a result of long-term lying in bed during which shearing force and friction increase. Nurses shall evaluate their wounds and skins for integrity before handover. Professional nurses of wounds shall formulate an intervention plan for pressure ulcer prognosis, would management and position management, patrol wards, observe and evaluate patients, and deal with any abnormality timely.

Postoperative respiratory tract management: Patients received respiratory treatment immediately after the trachea cannula was drawn, and were evaluated by professional nurses from the Respiratory Department for respiratory functions to establish the respiratory treatment plans. Oxygen masks were used to moisturize air passages and for oxygen therapy with concentration at ~50% and oxygen flowrate at 10 L/min, which were properly adjusted based on the patients' conditions. Wards were patrolled in the morning and afternoon everyday to check the ABG results and guide patients to cough correctly.

Observation indices

(1) Postoperative recovery: the two groups were compared in first time of getting out of the bed, urinary catheter indwelling time, postoperative LOS, and re-hospitalization rate 1 month after discharge.

(2) Postoperative complications: the two groups were compared in the incidences of atelectasis, anastomotic stoma fistula, chylopleura and pulmonary infection.

(3) Nutritional status: the two groups were evaluated for nutritional status 1 d, 10 d and 1 month after surgery by Subjective Global Assessment (SGA) [12], including history of the disease, such as changes in weight, dieting, movement ability, stress reaction and gastrointestinal symptoms, and physical examinations which cover subcutaneous fat thickness, muscle measurement and edema. Each item values 1 to 3, and the full mark of the scale ranges between 8 and 24. A higher mark indicates less satisfactory nutritional status.

(4) Pain intensity: patients were evaluated for pain intensity 1 d, 2 d, 3 d, 4 d, and 5 d after surgery by VAS, and the results were represented by 11 numbers from 0 to 10, of which, 0 indicates no pain, and 10 worst possible pain. Larger numbers represent more intense pains.

(5) Nursing satisfaction: patients were required to express their attitude toward the nursing before they were discharged in words "satisfactory", "generally satisfactory" and "dissatisfactory" in terms of basic nursing implementation, nursing safety, health education, and humanistic concerns. The total satisfaction = satisfactory rate + general satisfactory rate.

Statistical analysis

Statistical analysis was performed with SPSS-22.0. In case of measurement data expressed as mean ± standard deviation, intergroup and intragroup comparison studies were carried out through independent-samples T test; in case of enumeration data expressed as [n (%)], intergroup and intragroup comparison studies were carried out through X^2 test. ANVOA was used to analyze the multipoint comparison in the groups. $P<0.05$ was considered as statistically significant difference.

Results

Comparison of general materials in two groups

No significant difference was observed between the observation group and the control group in terms of proportions of males and females, mean age (observation group: 75.62±10.34; control group: 76.81±11.29), NRS2002 nutritional screening results (observation group: 68.96±4.59; control group: 70.62±5.22), mean weight (observation group: 3.95±1.66 kg; control group: 3.69±1.05 kg), proportions of squa-

Table 1. Comparison between the observation group and the control group in general materials ($\bar{x}$ ± sd)/[n (%)]

Materials		Observation group (n=36)	Control group (n=36)	t/X^2	P
Gender	M	21 (58.33)	20 (55.56)	0.057	0.812
	F	15 (41.67)	16 (44.44)		
Cytologic classification	Squamous carcinoma	31 (86.11)	29 (80.56)	0.400	0.527
	Adenocarcinoma	5 (13.89)	7 (19.44)		
Concurrence of basis diseases	Diabetes mellitus	3 (8.33)	4 (11.11)	0.528	0.316
	Hypertension	10 (27.28)	8 (22.22)		
	Coronary heart disease	4 (11.11)	3 (8.33)		
Age (years)		75.62±10.34	76.81±11.29	0.466	0.642
NRS2002 nutritional screening score (points)		75.62±10.34	70.62±5.22	1.433	0.156
Weight (kg)		63.95±1.66	63.69±1.05	0.794	0.430

Table 2. Comparison between the observation group and the control group in postoperative recovery indices ($\bar{x}$ ± sd)/[n (%)]

Group	First time of getting out of the bed (h)	Urinary catheter indwelling time (h)	LOS (d)	Re-hospitalization Rate
Observation Group (n=36)	16.54±3.92	92.46±35.19	13.52±3.29	1 (2.78)
Control Group (n=36)	35.64±7.81	125.43±46.90	17.63±4.21	3 (8.33)
t/X^2	13.114	3.374	4.615	1.059
P	0.000	0.001	0.000	0.303

mous carcinoma and adenocarcinoma, and concurrent diabetes [observation group: 3 (8.33%); control group: 4 (11.11%)], concurrent hypertension [observation group: 10 (27.78%); control group: 8 (22.22%)] and concurrent coronary disease [observation group: 4 (11.11%); control group: 3 (8.33%)] (P>0.05, **Table 1**).

Comparison of postoperative recovery in two groups

The observation group excelled the control group in terms of the first time of getting out of the bed (observation group: 16.54±3.92 h; control group: 35.64±7.81 h), urinary catheter indwelling time (observation group: 92.46± 35.19 h; control group: 125.43±46.90 h), postoperative LOS (observation group: 13.52±3.29 d; control group: 17.63±4.21 d) significantly (P<0.05), and in re-hospitalization rate 1 month after discharge (observation group: 2.78%; control group: 8.33%) slightly (P>0.05) (**Table 2**).

Comparison of complications incidence in two groups

After surgery, the observation group had 5 cases of complications with an incidence of 13.89%, including atelectasis (1), chylopleura (1), pulmonary infection (2) and anastomotic stoma fistula (1), while the control group had 13 cases of complications with an incidence of 36.11%, including atelectasis (3), chylopleura (2), pulmonary infection (5) and anastomotic stoma fistula (3) (P<0.05, **Table 3**).

Comparison of preoperative and postoperative nutritional status in two groups

On the basis of insignificantly difference of SGA scores for nutritional status 1 d before surgery (P>0.05), both groups attained intragroup reductions 10 d and 1 month after surgery (P<0.05), which were more significant in the observation group than that of the control group accordingly (P<0.05, **Table 4**).

Comparison of pain intensity in two groups

One day after surgery, the observation group had a pain intensity score of 6.86±1.38, which was not significantly different than that of the control group which was 6.34±1.52 (P>0.05); but from 2 d to 5 d, differences between the 2 groups in pain intensity score were significant (P<0.05) based on the reported data of

Table 3. Comparison between the observation group and the control group in postoperative incidence of complications [n (%)]

Group	Atelectasis	Chylopleura	Pulmonary infection	Anastomotic stoma fistula	Incidence
Observation Group (n=36)	1 (2.78)	1 (2.78)	2 (5.56)	1 (2.78)	5 (13.89)
Control Group (n=36)	3 (8.33)	2 (5.56)	5 (13.89)	3 (8.33)	13 (36.11)
X^2					4.741
P					0.029

Table 4. Comparison between the Observation Group and the Control Group in SGA Scores 1 d before, 10 d and 1 m after Surgery ($\overline{x}$ ± sd, score)

Group	1 d before Surgery	10 d after Surgery	1 m after Surgery
Observation Group (n=36)	16.86±3.85	11.35±3.26	7.49±2.49
Control Group (n=36)	17.02±3.89	14.27±3.35	9.98±2.53
X^2	0.175	3.748	4.209
P	0.861	0.000	0.000

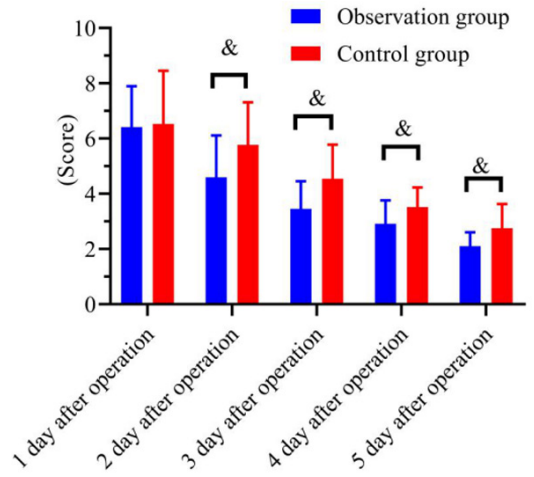

Figure 1. Comparison between the observation group and the control group in postoperative pain intensity. In terms of VAS score, 1 d after surgery, the observation group had no significant difference from that of the control group ($P>0.05$), but showed lower scores from 2 d to 5 d ($P<0.05$). & indicated that $P<0.05$ was compared at the same time point between the two groups.

4.86±1.06, 3.26±0.84, 2.89±0.53 and 2.13±0.37 of the observation group and 5.87±1.24, 4.37±0.93, 3.67±0.66 and 2.76±0.42 of the control group (**Figure 1**).

Comparison of nursing satisfactory rate in two groups

In the observation group, 13 patients were satisfied, 20 generally satisfied and 3 dissatisfied with nursing, with a satisfactory rate of 91.67%, while in the control group, the corresponding data were 11, 15, 10 and 72.22% (X^2= 4.600, P=0.032) (**Figure 2**).

Discussion

In a MDT, decisions are made by a collective nursing team with experts from more than one discipline on the basis of the disease and treatment [13, 14]. The team brainstorms all disciplinary knowledge, techniques and experience to formulate, implement and evaluate the effectiveness of the nursing plan to achieve maximal nursing effects [15]. As studies go further, MDT is applied in the nursing of patients with various diseases form the surgical department [16, 17]. This study specifically analyzed the application values of MDT in surgical nursing of patients with esophageal cancer.

In the observation group, the application of MDT resulted in significant reduction in the first time of getting out of the bed and urinary catheter indwelling time as compared with the controls who were only routinely nursed. Analysis proved that under the MDT, patients were encouraged to leave bed for movement 1 d after the surgery under nurses' guides on the basis of early extubation. While in routine surgical nursing, the time of getting out of the bed for movement was a decision of the patients according to their own willingness, which resulted in a longer stay in bed. Lok CE et al [18] held the ground that male patients shall be trained by clamping the ureter after the surgery, which is drawn as they have a urine-holding sensation, while for female patients who are not suffering from urinary obstruction, the ureter shall be extubated 1 d after the surgery. Their ground was supported by Jiang H [19] who agreed that the indwelling time of catheters shall be reduced as far as possible and controlled with-

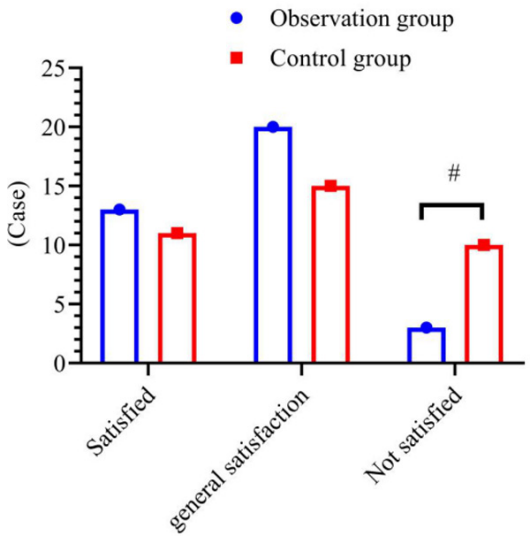

Figure 2. Comparison between the observation group and the control group in nursing satisfactory rate. Between the observation group and the control group, no difference was observed in proportions of satisfied and generally satisfied patients ($P>0.05$), and the observation group reduced fewer patients who were dissatisfied as compared with the control group ($P<0.05$). # indicated that $P<0.05$ was compared at the same time point between the two groups.

in 1 d. In the present study, the observation group reported a postoperative LOS obviously shorter than the control group, which shall be attributed to the more efficient cooperation between team members in the MDT that they have a clear understanding of duties, and the assignments are arranged properly to ensure all nursing items to be implemented practically, and to achieve more satisfactory nursing effects so that patients recover rapidly after surgery, stay a shorter time in hospital and bear less medical expenses [20]. The study of Mitchell F et al [21] revealed that the nursing intervention based on rapid recovery nursing model and MDT can effectively cut down patients' LOS in hospital.

While the observation group was not statistically different from the control group in terms of the re-hospitalization rate 1 month after discharge (observation group: 2.78%; control group: 8.33%; P>0.05), its reported postoperative incidence of complications was 13.89%, significantly lower than the control group which was 36.11% ($P<0.05$), indicating that MDT can further improve surgical safety as a part in surgical nursing, and is an important factor leading to the rapid recovery of patients. The observation group was significantly lower than the control group in terms of SGA scores for nutritional status at 10 d and 1 month after surgery (P<0.05) indicating better nutritional status in the observation group because in the MDT-based surgical nursing, nurses paid more attention to the nutritional evaluation and intervention, and actively guided patients in this regard, to make sure they were provided with rational diets which were properly changed to assist the progressive improvement of patients' nutritional status. The present study also reported a lower VAS score of pain intensity at 2 d, 3 d, 4 d and 5 d after surgery and a higher satisfactory rate in the observation group as compared with the control group (P<0.05), which shall be attributed to the effective control of postoperative pains by multimodal pain management, assisting the patients to enter the recovery exercise stage with recovery quality guaranteed, and thus, patients were more satisfied. Through analysis, the advantages of MDT were reflected in two aspects. The first is the establishment of a highly professional nursing team, in which, each member is highly qualified from each department to ensure the quality of nursing from all aspects [22]. The second is personalized health propaganda and education to elevate patients' compliance and understanding [23]. Furthermore, under the MDT, higher requirements were put forward against the activity, positivity and accountability of nurses, who also built teamwork awareness during the process, which played a key role in improving their comprehensive accomplishments [24]. O'Reilly P et al [25] revealed through their study that compared with clinical pathways in nursing, MDT-based nursing intervention provided patients with more comprehensive evaluation so that the preparation for treatment and nursing was more sufficient.

The MDT has demonstrated the satisfactory application value by making contributions to the alleviated postoperative pain intensity and complications, and accelerated postoperative recovery in elderly patients who received a TLE. However, the present study was disadvantaged because of few study objects, short follow-ups, less study indices and less sufficiently representative results. In the future, perspective studies based on a large sample size and a longer follow-up will be stressed for in-depth inves-

tigation and acquisition of more representative results to confirm the application values of MDT in surgical nursing and to provide more references for nursing of elderly patients who received a TLE.

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Disclosure of conflict of interest

None.

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