

# Application Effect of Enhanced Recovery After Surgery on Perioperative Nursing of Patients with Thyroid Cancer

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**Abstract:** Objective: To evaluate the perioperative effect of enhanced recovery after surgery (ERAS) in patients with thyroid cancer. Methods: The clinical data of 82 patients with thyroid cancer admitted in Liuzhou Municipal Liutie Central Hospital from January 2019 to December 2020 were retrospectively analyzed. They were divided into the ERAS group ( $n=42$ ) and the control group ( $n=40$ ). Patients in the ERAS group received perioperative nursing care based on ERAS concept while those in the control group received routine perioperative nursing care. The first postoperative off-bed time, hospitalization stay, hospitalization costs, complication rate and patients' satisfaction were compared between the two groups. Results: The first postoperative off-bed time in the ERAS group was earlier than that in the control group, hospitalization stay in the ERAS group was less than that in the control group, hospitalization cost in the ERAS group was less than that in the control group, the incidence of postoperative complications in the ERAS group was lower than that in the control group and patients' satisfaction in the ERAS group was higher than that in the control group (all  $P<0.05$ ). Conclusion: ERAS concept applied into perioperative care of patients with thyroid cancer can promote early rehabilitation, reduce postoperative complications and improve patients' satisfaction.

**Keywords:** Enhanced Recovery After Surgery, Thyroid Cancer, Perioperative Period, Nursing Care

## 1. Introduction

In 1990s, Danish Professor Kehlet first proposed the concept of Enhanced Recovery after Surgery (ERAS) [1]. In 2007, Professor Li Jieshou's team first introduced this concept into Chinese clinical practice [2]. ERAS concept is the specific embodiment of evidence-based medicine in clinical surgery, which aims to reduce the physiological and psychological traumatic stress response of surgical patients and optimize perioperative management so as to accelerate the recovery of patients [3-5]. In this study, ERAS concept was applied to perioperative care of thyroid cancer patients and satisfactory results were achieved, which is reported as follows.

## 2. Data and Methods

### 2.1. Clinical Data

A total of 82 patients diagnosed with thyroid cancer and

undergone concurrent operation from January 2019 to December 2020 in third department of General Surgery of Liuzhou municipal Liutie Central Hospital were selected as the observation subjects. Inclusion criteria: (1) Patients diagnosed with thyroid cancer according to medical history, clinical manifestations, imaging data and biopsy pathological results; (2) Consent to thyroid cancer resection; (3) Those who are informed of the study and have signed the consent; (4) Complete medical records. Exclusion criteria: (1) Advanced thyroid cancer with systemic metastasis; (2) Patients with a history of neck surgery or radiotherapy; (3) Severe medical diseases can't tolerate anesthesia and surgery; (4) Infection at neck incision and adjacent sites; (5) Do not agree with regular follow-up after surgery. 40 patients admitted on a single day were enrolled in the control group and received routine care, while 42 patients admitted on a double day were enrolled in ERAS group and received perioperative care guided by the concept of ERAS. In the control group, there were 17 males and 23 females. The age

ranged from 43 to 78 years, with an average of  $(61.8 \pm 8.21)$  years. The clinical stages of thyroid cancer were stage I 16 cases, stage II 24 cases. In ERAS group, there were 24 males and 18 females, aged from 41 to 80 years, with an average of  $(62.2 \pm 8.15)$  years. The clinical stages of thyroid cancer were stage I 22 cases, stage II 20 cases. The two groups were performed by the same surgical group, and there was no significant difference in gender, age and clinical stage between the two groups ( $P > 0.05$ ).

## 2.2. Nursing Methods

### 2.2.1. Control Group

(1) Preoperative evaluation: The preoperative responsible nurse evaluated the patient's nutritional status, self-care ability and sleep. Otorhinolaryngologist consultation was conducted to evaluate the patient's airway, and preoperative pulmonary function examination was performed to evaluate the patient's respiratory function. (2) Preoperative education: the responsible nurse patiently explained the patient's condition to the patient and their family members, and carried out preoperative health education by one-to-one appearance teaching and health education manual, so that the patient could eliminate tension. (3) Preoperative management: patients were instructed to quit smoking and drinking 1 week before surgery, to stop taking aspirin and other anticoagulant drugs 5 days before surgery, and to perform neck hyperextension surgical position training 1 day before surgery (patients were instructed to lay on their shoulders and back with soft pillows, and take neck extension position, three times a day, about 20 min once). Keep the ward quiet and comfortable, and report to the doctor for sedative and hypnotic medication if necessary. Before surgery, skin was prepared, clothing changed, fasting for 12h and drinking for 8h. If the operation was performed on the table, intravenous fluid replacement was given according to the doctor's advice. (4) Intraoperative measures. (5) Postoperative management: psychological nursing health guidance: postoperative 1 week to guide patients to Meter Word exercise, the first step of shoulder relaxation, do not force; Step 2 downward movement of jaw; Step 3 Gently turn your neck to the right and left, without turning your shoulders; Step 4 Bend to the right, bend to the left, ears almost close to the shoulders; Step 5 rotate shoulder; Step 6 Raise your arms. Three days after discharge, the nurse made a telephone or wechat return visit to understand the patient's recovery and conducted a satisfaction survey.

### 2.2.2. ERAS Group

(1) Preoperative evaluation: same as the control group. (2) Preoperative education: A combination of various education methods is adopted. ERAS' ward has ERAS knowledge column, self-made ERAS video education, health education manual, one-to-one oral education by nurses, wechat group education for patients of ERAS, etc. Education includes: explaining ERAS 'concept in detail to patients, emphasizing that ERAS aims at multiple benefits for patients, so that patients can fully understand the advantages of ERAS and

better coordinate with ERAS' implementation. Psychological nursing: introduce surgical methods, qualifications and techniques of surgical physicians, and share postoperative experience with ward patients to eliminate preoperative anxiety. (3) Preoperative management: ERAS special wards were set up to avoid confusion with the control group. In order to facilitate the effective implementation of ERAS measures, multiple forms of ERAS logo management are adopted, which are marked on electronic medical orders, medical records, bedside cards and patient uniforms. ERAS Ward is equipped with ERAS step meter landmark, mobile infusion stand, mobile monitor, etc. Quit smoking 1 week before surgery, avoid drinking alcohol 3 days before surgery, for patients > 60 years old or with lung diseases to carry out respiratory muscle training, when necessary, acetyl cysteine solution 3ml+physiological saline 5ml atomization inhalation. Neck functional training was performed 1 day before surgery. 1 day before surgery, no drinking tea, coffee, etc; fasting 4 hours before surgery, no drinking for 2 hours; before 6 o'clock on the day of surgery, drink no more than 300ml warm water or beverages, such as sugar brine, sports drinks or nutritionist's homemade nutrition meal. If the operation is delayed for 1 hour, 50ml of clear drink can be added. (4) Intraoperative measures: intraoperative heat preservation measures were used to control the patient's body temperature between  $36.0^{\circ}\text{C}$  and  $37.0^{\circ}\text{C}$ , and the amount of liquid was controlled within 600 ml. (5) postoperative management: 1) the drainage tube should be removed as soon as possible. The postoperative incision drainage tube should be connected with a thin rubber hose with a negative pressure drainage device, with a negative pressure of 125-300 mmHg. The placement time depends on the drainage flow. 2) Actively manage pain, prophylactic administration of non-steroidal anti-inflammatory and analgesic drugs (celecoxib capsules) with little damage to gastrointestinal before pain. Multimodal analgesia (intravenous or intramuscular analgesics) was used in patients with obvious pain. The nurse assessed the patient's pain every 2 hours and recorded it. 3) early ambulation, postoperative anesthesia after waking in the patients with physical ability allowed cases can get out of bed, those can't get out of bed, giving turn over in bed and guidance for prevention of thrombosis. The responsible nurse increases or decreases the patient's activity amount and activity plan according to the patient's completion every day. 4) Restore diet as soon as possible. When patients are awake from anesthesia, 1~2 spoons of warm water can be given, without malignant vomiting, choking can be liquid diet, and gradual transition to ordinary diet. 5) Closely observe the vital signs, perative complications and psychological nursing, the same as the control group. (6) Health guidance: 1 week after surgery, patients were instructed to conduct neck function exercise with Meter Word exercise, 3 times a day, exercise for 1-2 months. discharge return visit: 3 days after discharge, 1 month, 3 months and 6 months, telephone or wechat return visit to understand the recovery of patients, satisfaction survey.

### 2.3. Observation Indicators

The first postoperative off-bed time, hospitalization stay, hospitalization costs, complication rate and patients' satisfaction were compared between the two groups. The calculation method was (number of very satisfied cases + number of satisfied cases)/total number of cases  $\times 100\%$ .

### 2.4. Statistical Methods

SPSS 27.0 statistical software was used for data analysis. Measurement data were expressed as " $\bar{x} \pm s$ ". The Chi-square test was used for intra-group comparison, and the independent sample *t*-test was used for inter-group

comparison.  $P < 0.05$  was considered statistically significant.

## 3. Result

### 3.1. Comparison of the First Postoperative Off-Bed Time, Hospitalization Stay and Hospitalization Costs Between the Two Groups

The first postoperative off-bed time in the ERAS group was earlier than that in the control group, hospitalization stay in the ERAS group was less than that in the control group, hospitalization cost in the ERAS group was less than that in the control group, with statistically significant differences (all  $P < 0.05$ ), see Table 1.

**Table 1.** Comparison of the first postoperative off-bed time, hospitalization stay and hospitalization costs between the two groups ( $\bar{x} \pm s$ ).

group	Cases (n)	the first postoperative off-bed time (h)	hospitalization stay (d)	hospitalization costs (RMB)
ERAS group	42	2.25 $\pm$ 1.06	4.15 $\pm$ 1.27	10 251.32 $\pm$ 432.63
control group	40	6.52 $\pm$ 1.68	5.83 $\pm$ 2.34	14 208.53 $\pm$ 572.55
<i>T</i> value		7.243	9.250	11.331
<i>P</i> value		0.010	0.015	0.012

Note: ERAS is enhanced recovery after surgery.

### 3.2. Comparison of Postoperative Complications Between the Two Groups

The incidence of postoperative complications in ERAS group was lower than control group, the difference was statistically significant ( $P < 0.05$ ). see Table 2.

**Table 2.** Comparison of postoperative complications between the two groups [Cases (%)].

group	Cases (n)	Haemorrhage (n)	nerve injury (n)	hypoparathyroidism (n)	infection (n)	The overall complication rate [(n) (%)]
ERAS group	42	1	1	2	1	5 (11.90)
control group	40	3	5	6	3	17 (42.50)
$\chi^2$ value						9.38
<i>P</i> value						0.014

Note: ERAS is enhanced recovery after surgery.

### 3.3. Comparison of Satisfaction Rate Between the Two Groups

The satisfaction rate of patients in ERAS group was higher than control group, and the difference was statistically significant ( $P < 0.05$ ), see Table 3.

**Table 3.** Comparison of satisfaction rate of thyroid cancer patients between the two groups [Cases (%)].

group	Cases	Very satisfied	satisfied	No satisfied	Satisfaction rate
ERAS group	42	37 (88.10)	4 (9.52)	1 (2.38)	41 (97.62)
control group	40	23 (57.50)	9 (22.50)	8 (20.00)	32 (80.00)
$\chi^2$ value					4.046
<i>P</i> value					0.041

Note: ERAS is enhanced recovery after surgery.

## 4. Discussions

Thyroid cancer is more common in clinical thyroid malignant tumor, originated in the thyroid epithelial cells, surgical removal of the tumor is still the main scheme in the clinical treatment of thyroid, but because of its special thyroid anatomic structure, rich in nerve around blood vessels, and the particularity of tumor growth, in a high risk of damage blood vessels, nerves, postoperative hoarseness,

choking, incision hematoma, hypocalcemia, Horner syndrome and other complications are easy to occur, causing a double blow to patients both physically and psychologically, which is not conducive to clinical recovery.

ERAS 'concept is an extension of minimally invasive surgery, first applied in gastrointestinal surgery, and now popularized in cardiothoracic surgery, urology, obstetrics and gynecology, orthopedics and other clinical specialties both at home and abroad, with satisfactory results. ERAS concept was applied to perioperative care of thyroid cancer patients in

this study. Preoperative scientific education on ERAS concept and professional knowledge was conducted through paper and video education to inform patients that ERAS concept application can bring multiple benefits to them. Patients and their families accepted the concept psychologically and actively participated in coordinated treatment. The purpose of fasting and drinking prohibition before surgery is to ensure gastric empties of patients and avoid risks such as reflux and aspiration after anesthesia, but patients are prone to hunger and thirst after prolonged fasting and drinking prohibition [6, 7]. Preoperative abstinence from smoking and alcohol can reduce respiratory system and wound complications and postoperative pain [8]. Patients should be screened for nutritional risk, and if nutritional risk exists, further nutritional assessment should be made and reasonable personalized nutritional support should be formulated. ERAS concept simplifies preoperative intestinal preparation, significantly reduces the duration of fasting and water prohibition before surgery, and takes 200-300 ml clear drink 2 hours before surgery to eliminate hunger and stomach discomfort, reduce hypoglycemia and other adverse reactions, increase patient comfort and improve surgical tolerance. Early out of bed activity is also an important principle of ERAS Philosophy. After the patient is awake under intravenous general anesthesia after surgery, the patient can be asked to get out of bed and move. Timely drinking and eating without nausea or vomiting can promote gastrointestinal function recovery, safe and effective nutrition supplementation, accelerate recovery, and shorten hospital stay. In this study, the time of postoperative bed activity in ERAS group was earlier than that in the control group ( $P<0.05$ ), the length of hospital stay was shorter than that in the control group ( $P<0.05$ ), and the hospitalization cost was less than that in the control group ( $P<0.05$ ), suggesting that using ERAS concept in the whole-course care of patients undergoing thyroid cancer surgery can indeed benefit patients from both clinical efficacy and economics. ERAS concept can significantly reduce the dose of opioids. Lide *et al.* [9] performed ERAS management in 171 patients undergoing thyroid and parathyroid tumor surgery, and the results showed that ERAS management can reduce the risk of complications. Similar findings were found in this study, a total of 5 cases of complications occurred in ERAS group, with a complication rate of 11.90%, including 1 case of hematoma caused by incision hemorrhage, 1 case of hoarseness after recurrent laryngeal nerve injury, 2 cases of hypocalcaemic tic hypothyroidism after intraoperative misresection of parathyroid gland, and 1 case of postoperative incision infection. There were 17 complications in the control group, with a complication rate of 42.50%, including 3 cases of hematoma and hematoma caused by incision hemorrhage, 3 cases of hoarseness after recurrent laryngeal nerve injury, 1 case of cough caused by drinking water after superior laryngeal nerve injury, 6 cases of hypothyroidism after intraoperative misresection of parathyroid gland, and 3 cases of postoperative incision infection. Horner syndrome occurred after sympathetic nerve

injury in 1 case. The results showed that the application of ERAS concept in perioperative care of patients with thyroid cancer can significantly reduce the incidence of complications.

## 5. Conclusions

Many studies at home and abroad have clarified the application value of ERAS concept in the perioperative period of surgery. Zhang Han's team [10] studied 168 patients with thyroid cancer and showed that the implementation of ERAS combined with incentive nursing can reduce the pain degree of patients, while helping to improve patients' negative emotions and improve their quality of life. Our study further demonstrated that ERAS concept application in perioperative care of thyroid cancer can help patients get out of bed earlier after surgery, shorten the length of hospital stay, reduce hospitalization costs, reduce the incidence of postoperative complications, and improve the satisfaction rate of patients, which is worthy of clinical promotion and application. The application of ERAS concept requires multidisciplinary collaboration, involving not only surgeons, anesthesiologists, rehabilitation therapists, specialist nurses, but also patients themselves and their families, and the cooperation of all parties is still facing difficulties in clinical practice [11]. Although our study embodies the ERAS concept applied in the patients with thyroid cancer surgery in perioperative care can achieve satisfactory application effect, consistent with the results of the study before [12-16], but there are still a relatively small sample size, this study the imperfection of the material, and ERAS single-double day admission grouping method is used for the ERAS group and the control group, failed to achieve completely randomized grouping, Easy to cause bias. In the future, the study design needs to be improved to better control and reduce bias in order to improve the quality of applied studies of ERAS and the level of evidence for results.

## Conflict of Interest

All the authors do not have any possible conflicts of interest.

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