

# *The efficacy of enhanced recovery after surgery strategy on post-surgical rehabilitation of patients with chronic diseases*

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**Keywords:** Enhanced recovery after surgery; anesthesia management; chronically ill patients

**Abstract:** Our research aims to explore the impact of rapid recovery strategies on the efficacy of post-surgical rehabilitation of chronically ill patients. 160 cases of chronically ill patients who underwent surgery admitted to our hospital from May 2022 to May 2023 were selected and randomly divided into 80 cases each in the control group and the study group; the enhanced recovery after surgery (ERAS) group implemented the rapid rehabilitation surgical strategy in anesthesia management, and the control group implemented the conventional anesthesia management; the evaluation indexes related to the perioperative period of the patients in the two groups were compared, including the temperature in the different time points of the two groups; the postoperative pain score, strong analgesia utilization rate; postoperative hospitalization days and hospitalization cost. The temperature of the ERAS group was at a higher level at 1h after anesthesia and at the end of surgery, and it was higher than that of the control group ( $P < 0.05$ ). The postoperative pain score and strong analgesic utilization rate of the ERAS group were lower than that of the control group, and the difference was statistically significant ( $P < 0.05$ ). Hospital stay and hospitalization costs of the ERAS group were smaller than those of the control group ( $P < 0.05$ ). **CONCLUSION:** Rapid rehabilitation strategy for post-surgical rehabilitation of chronically ill patients can play a role in maintaining higher temperature, reducing patients' postoperative pain, shortening postoperative hospitalization time, and saving medical costs. Therefore, it is recommended that rapid rehabilitation strategies be actively used in the process of post-surgical rehabilitation of chronically ill patients to promote early recovery.

## **1. Introduction**

Surgery in chronically ill patients is a challenging medical procedure that requires comprehensive consideration of the patient's physical condition, disease control, and surgical risk <sup>[1]</sup>. Chronically ill patients usually have more comorbidities and organ function damage during surgery due to their poorer physical condition, which increases the risk of surgery. Moreover, chronically ill patients may have problems such as cardiopulmonary insufficiency, and liver and kidney impairment, which can increase the difficulty and risk of anesthesia <sup>[2]</sup>. The choice of anesthetic drugs needs to be careful and individualized anesthetic management is required. The recovery process after surgery in chronically ill patients is usually longer and requires more time and effort <sup>[3]</sup>. Surgery in chronically

ill patients has some drawbacks although it helps to improve the patient's condition.

Enhanced recovery after surgery (ERAS), also known as rapid recovery surgery or fast-track surgery, is a comprehensive treatment approach aimed at accelerating a patient's recovery from surgery [4]. By reducing surgical trauma, optimizing perioperative management, and providing a personalized recovery plan, this approach aims to minimize patient hospital stay, reduce pain, decrease complication rates, and promote postoperative functional recovery. Some studies have shown that enhanced recovery after surgery can significantly reduce patient length of stay, shorten postoperative recovery time, and decrease complication and readmission rates [5]. Although the successful implementation of rapid rehabilitation surgery requires the cooperation of a multidisciplinary team and the active participation of patients, its important impact on the efficacy of post-surgical rehabilitation of chronically ill patients deserves further investigation [6]. In this paper, 160 chronically ill patients who underwent surgery in our hospital were grouped to explore the clinical effects of implementing rapid rehabilitation strategies for chronically ill patients in the perioperative period, which are reported as follows.

## 2. Information and Methods

### 2.1 General information

160 cases of chronically ill patients who underwent surgical operations admitted to our hospital from May 2022 to May 2023 were selected. Inclusion criteria: ① diagnosed as chronically ill patients; ② ASA classification I to III; ③ no history of surgical anesthesia, serious cardiovascular and cerebral vascular diseases, neurological or psychiatric disorders; and ④ willing to fully express their true experience and feelings after illness. Exclusion criteria: ① those who were severely malnourished or combined with severe infections; ② those who had a history of surgical anesthesia, severe cardiovascular and cerebrovascular diseases, and neurological or psychiatric diseases; ③ those who were not cooperative with the researcher's explanations for their functional and organic mental illnesses; and ④ those who were functionally and organically mentally ill. They were divided into 80 cases each in the control group and the study group by using the random number table method. 43 cases of men and 37 cases of women in the ERAS group were aged 50-75 years, with an average age of  $(63.52 \pm 3.14)$  years, and ASA classification: 12 cases of grade I, 44 cases of grade II, and 24 cases of grade III. In the control group, there were 46 male and 34 female cases, aged 52-75 years, with an average age of  $(64.04 \pm 5.27)$  years, ASA grading: 11 cases of grade I, 46 cases of grade II, and 23 cases of grade III. There was no significant difference between the two groups of cases in terms of gender, age, and ASA classification in terms of underlying characteristics ( $P > 0.05$ ).

### 2.2 Anesthesia methods

The ERAS group implemented anesthesia management under the ERAS strategy, and the control group implemented conventional perioperative treatment and anesthesia methods. Specifics include: ① Advance preoperative anesthesia consultation to optimize the patient's physical condition and nutritional status. ② Verbally informing patients of all perioperative-related matters. ③ Select appropriate anesthesia methods: induction with conscious sedation and transnasal intubation under surface anesthesia, difficult airway under fiberoptic bronchoscopy. ④ Intraoperative monitoring: electrocardiographic monitoring (ECG), blood pressure monitoring, blood oxygen saturation monitoring (SpO<sub>2</sub>), carbon dioxide monitoring (ETCO<sub>2</sub>), anesthesia depth monitoring, temperature monitoring, and fluid monitoring. ⑤ Early postoperative activity and functional recovery, early

resumption of oral diet to minimize intestinal dysfunction and postoperative complications.

### 2.3 Evaluation indexes

To evaluate the effectiveness of two treatment groups in a clinical study, several key indices are assessed. Firstly, the temperature of patients is recorded at distinct time points: upon admission (T0), one hour after anesthesia (T1), and at the end of the operation (T2). This helps in understanding the physiological response to treatment at different stages. Secondly, the postoperative pain scores are evaluated, along with the necessity for strong analgesia, which indicates the effectiveness of pain management strategies. Lastly, the duration of postoperative hospitalization and the associated costs are calculated. These measures provide insights into the recovery process and the economic impact of the treatments.

### 2.4 Statistical methods

The data in this paper were analyzed by the statistical software SPSS21.0, ( $\bar{x} \pm s$ ) indicates the measurement data, the ANOVA was carried out within the group, and the t-test of two independent samples was performed between the groups; the counting data were expressed as the absolute number and the constitutive ratio, and the  $\chi^2$  test was given, and the difference of  $P < 0.05$  was considered to be statistically significant.

## 3. Results

### 3.1 Comparison of temperature at different time points between the two groups of patients

Comparison of temperatures at the time of admission (T0), 1h after anesthesia (T1), and at the end of surgery (T2) between the two groups showed that the control of temperatures of patients in the ERAS group was significantly better than that of the control group ( $p < 0.05$ ), as shown in Table 1.

Table 1: Comparison of temperatures at different time points between the two groups of patients ( $\bar{x} \pm s, ^\circ\text{C}$ )

groups	number of cases	post entry(T0)	1h after anesthesia(T1)	end of the operation(T2)
ERAS group	80	36.34 $\pm$ 0.37	36.19 $\pm$ 0.54	36.23 $\pm$ 0.34
Control group	80	36.18 $\pm$ 0.29	35.95 $\pm$ 0.18	36.02 $\pm$ 0.21
t		1.113	10.421	12.093
P		0.002	0.000	0.000

### 3.2 Comparison of postoperative pain scores and strong analgesic utilization rate between the two groups of patients

Table 2: Comparison of postoperative pain scores and utilization of strong analgesia between the two groups of patients ( $\bar{x} \pm s$ )

groups	number of cases	Pain scores	Potent analgesic utilization rate
ERAS group	80	4.59 $\pm$ 0.31	35(43%)
Control group	80	5.79 $\pm$ 0.53	44(55%)
t/ $\chi^2$		7.415	9.782
P		0.001	0.000

Comparison of postoperative pain scores and strong analgesic utilization rate of patients in the two groups were compared, and the results showed that the pain scores and strong analgesic utilization rate of patients in the ERAS group, were significantly lower than those of the reference group ( $p < 0.05$ ). The results are shown in Table 2.

### 3.3 Comparison of postoperative hospitalization days and hospitalization costs between the two groups of patients

A comparison of postoperative hospitalization days and hospitalization costs of patients in the two groups showed that the number of hospitalization days and hospitalization costs of patients in the ERAS group were significantly lower than the data of the control group ( $p < 0.05$ ). The results are shown in Table 3.

Table 3: Comparison of postoperative hospitalization days and hospitalization costs between the two groups of patients

groups	number of cases	Post-operative hospitalization days/day	Hospitalization costs/yuan
ERAS group	80	3.24±0.16	9257±131
Control group	80	5.07±0.22	1012±290
t		2.457	4.230
P		0.001	0.000

## 4. Conclusion

Currently, the rapid recovery strategy in anesthesia refers to a series of measures taken during anesthesia to minimize the effects of surgical trauma and anesthetic drugs on patients and promote early recovery. Through the comprehensive application of rapid recovery strategies in anesthesia, the recovery process of patients can be accelerated, the incidence of complications can be reduced, the length of hospitalization can be shortened, and the quality of postoperative life can be improved [7]. In this study, it was found that the implementation of rapid recovery strategies during surgery in patients with chronic diseases can play a role in maintaining a higher temperature, reducing surgical risks, improving surgical safety, reducing patients' postoperative pain, and shortening postoperative hospitalization time for patients' postoperative recovery, which can help patients to save medical costs [8]. Therefore, it is recommended that rapid recovery strategies be actively used throughout the surgical phase in chronically ill patients to promote early recovery.

Rapid recovery strategies in anesthesia are a comprehensive approach to management [9]. These strategies encompass several areas, including preoperative preparation, anesthesia management, postoperative care, and teamwork. First, preoperative preparation is critical for rapid recovery [10]. Before surgery, the medical team conducts a comprehensive assessment of the patient to understand his or her basic health status, surgical risk factors, and special needs. Based on the assessment, an individualized preoperative preparation plan is developed. The goal of preoperative preparation is to minimize surgical risks and postoperative complications [11]. Second, anesthesia management plays a key role in the rapid recovery strategy. Appropriate anesthetic methods and medications are selected to minimize intraoperative and postoperative pain and discomfort. In addition, the rapid recovery strategy emphasizes intraoperative monitoring and adjustment, including real-time monitoring and maintenance of vital signs such as depth of anesthesia, blood pressure, heart rate, and oxygen saturation within a reasonable range to maintain patient stability and safety [12]. Of course, postoperative care is also one of the key aspects of the rapid recovery strategy. Postoperative analgesia

is one of the important measures for rapid recovery, which reduces postoperative pain and improves patients' comfort and speed of recovery through a reasonable analgesic program. In addition, it is necessary to focus on early postoperative rehabilitation training. Teamwork is a key element in the successful implementation of a rapid rehabilitation strategy. Anesthesiologists, surgeons, nursing teams, and rehabilitation specialists need to form a close collaborative mechanism to develop and implement the rehabilitation plan. Communication and collaboration are important for the success of rapid rehabilitation <sup>[13]</sup>.

Although rapid recovery strategies in anesthesia have many advantages in promoting postoperative recovery, there are some potential disadvantages: rapid recovery strategies may not apply to all patients, especially those with severe comorbidities or frailty <sup>[14]</sup>. Lighter anesthesia and analgesic medications may be required to achieve rapid recovery, which may increase the risk of intraoperative and postoperative anesthesia. To promote rapid recovery, patients may be restricted in their preoperative fasting time and postoperative dietary intake. This may result in inadequate energy and nutrient intake for the patient, affecting postoperative recovery and immune function <sup>[15]</sup>.

In summary, although rapid recovery strategies in anesthesia have many advantages, they also have some disadvantages. When implementing these strategies, the advantages and disadvantages need to be carefully weighed, and individualized decisions and management need to be made according to the patient's condition and characteristics. In addition, close monitoring of the patient's physiologic parameters and recovery outcomes is necessary to adjust the strategies promptly during the recovery process to obtain the best possible outcome <sup>[16,17]</sup>.

Our study shows that the introduction of ERAS intervention strategies in anesthesia management has significant advantages for chronically ill patients undergoing surgical procedures, and is worthy of clinical promotion. However, specific rapid recovery strategies need to be individualized and implemented according to different types of surgery and patient characteristics, which still needs to be further explored. Rapid recovery strategies in anesthesia are an important approach to advancing modern healthcare. Through comprehensive anesthesia assessment, individualized anesthesia management, application of technology, and teamwork, it can promote early recovery of patients, improve the quality of recovery, and make the surgical process safer and smoother. In the future, as technology continues to advance and clinical practice deepens, rapid recovery strategies will play an increasingly important role in the field of anesthesia and benefit more chronically ill patients.

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