

# Effect of ERAS Combined with Low-frequency Pulsed Electronic Bladder Therapy Instrument on Patients Who Received PPH

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**Abstract:** Objective: To assess effect of enhanced recovery after surgery (ERAS) combined with low-frequency pulsed electronic bladder therapy instrument on patients who received procedure for prolapse and hemorrhoids (PPH). Methods: From January 2020 to December 2020, we collected valid data from 172 patients. According to the random number table method, the participants were divided into intervention group and control group, 86 cases in each group. We provided traditional nursing intervention to control group participants during non-surgery period. In addition, we provided ERAS combined with low-frequency pulsed electronic bladder therapy instrument to intervention group participants. Result: Intervention group had better outcome in time of first exhaust, time of activity out of bed, and time of hospital stay compared with control group, that the results were significantly different ( $p < 0.05$ ). In degree of wound pain of patient, NRS scores in preoperative, six hours after surgery, and 24 hours after surgery were lower in intervention compared with control group, that the results were significantly different. Conclusion: ERAS combined with low-frequency pulsed electronic bladder therapy instrument can reduce wound pain of patient, and it speeds patient recovery, promotes early urination after surgery, reduces the risk of urinary retention, and shortens the length of hospital stay.

**Keywords:** Procedure for Prolapse and Hemorrhoids, Recovery After Surgery, Pulsed Electronic Bladder Therapy Instrument

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## 1. Introduction

Procedure for prolapse and hemorrhoids (PPH) is a common surgery for hemorrhoids treatment, that it also is one of hemorrhoids cure the most effective method [1]. PPH has been used clinically to treat III and IV degree internal hemorrhoids and mixed hemorrhoids, and has been well performed in more than 1.2 million patients worldwide [2, 3]. However, postoperative patients with hemorrhoids may have bleeding, pain, urinary retention and other complications, so patients have a fear of postoperative and defecation wound pain, will delay the treatment cycle and affect the urination, and even directly affect the quality of surgery [4]. In addition, patients may suffer from anxiety, depression, resistance to dressing change and other adverse psychological reactions, which will increase the mental, psychological and economic

burden of patients [5, 6].

Enhanced Recovery After Surgery (ERAS) is regarded as a global surgical quality improvement initiative that results in clinical and cost benefits [7]. ERAS refers to a series of optimized treatment measures proved effective by evidence-based medicine in order to make patients recover quickly, so as to reduce the psychological and physical traumatic stress response of patients, thereby reducing the occurrence of complications, shortening the length of hospital stay, reducing the risk of readmission and death, and reducing the medical costs [8-10].

In recent years, some researchers use ERAS combined with low-frequency pulsed electronic bladder therapy instrument to treat patients who received procedure for prolapse and hemorrhoids (PPH). However, their outcomes were different in their report, and their data was significantly difference [11,

12]. Therefore, the effect of Combination therapy of ERAS and low-frequency pulsed electronic bladder therapy instrument is worthy study. The aim of this study was to assess effect of ERAS combined with low-frequency pulsed electronic bladder therapy instrument on patients who received PPH.

## 2. Methods

To explore the effect of enhanced recovery after surgery (ERAS) combined with low-frequency pulsed electronic bladder therapy instrument, we established a randomized controlled trial, and analyzed the result by evaluating collected data. From January 2020 to December 2020, we observed 200 patients who received PPH, but we excluded flawed data from 28 patients, so we only collected valid data from 172 patients. According to the random number table method, the participants were divided into intervention group and control group, 86 cases in each group. We provided traditional nursing intervention to control group participants during non-surgery period. In addition, we provided ERAS combined with low-frequency pulsed electronic bladder therapy instrument to intervention group participants. In the study, we collected and analyzed related data of the two

groups, including first urination time, length of hospital stays, clinical efficacy (Inclusion criteria: (1) meeting the diagnostic criteria for urinary retention after PPH; (2) No previous history of mental illness; (3) Without severe organic disorders.). In the patient characteristics, participants in the intervention group ranged in age from 22 to 65 years old, with an average age of  $42.2 \pm 1.1$  years old, including 50 males and 36 females. The patients in the control group ranged in age from 21 to 64 years old, with an average age of  $41.8 \pm 1.3$  years old, including 49 males and 37 females. After that, we excluded data from patients with coagulopathy, malnutrition, and moderate anemia. There was no statistical significance in the comparison of the patient characteristic data between the two groups. We recorded the first time of getting out of bed, the first postoperative urination time, and the postoperative discharge time of patients in both groups. The numerical rating scale (NRS) was used to evaluate the degree of wound pain, with 0 being painless. A score of 10 is the most painful, and the higher the score, the more severe the pain.

Patients in the intervention group received the nursing intervention which was ERAS combined with low-frequency pulsed electronic bladder therapy instrument, and control group received traditional nursing intervention. The nursing intervention details of two groups were shown in Table 1.

*Table 1. Nursing intervention of two groups.*

nursing measures	Observer group (n = 86)	Control group (n = 86)
Health education	Develop a health education plan, which is issued and executed by responsible nurses	Oral education by responsible nurses
Intestinal preparation	Normal diet of 3 days before surgery	Preoperative 3 days, providing a semi-fluid diet
No diet before surgery	Preoperative 6 hours fasting solid foods, drinking 500mL sugar water (10%) for preoperative 2 hours non-diabetic patients, and drinking 500ml of physiological saline for diabetics.	12 hours fasting before surgery and 8 hours water ban before surgery
Intraoperative rehydration	Controlled rehydration	General open rehydration
Keep warm during surgery	Providing electric blankets, rehydration before use heating, hot air heating cover and other heating measures to avoid the patient's hypothermia.	No special insulation measures
Postoperative analgesics	Place an analgesic pumps or regular take pain relief	Providing painkillers when pain is unbearable
Induced urination care	Induced urination and low frequency pulsed electronic bladder therapy	Traditionally induced urination is used
Diet after surgery	Eating immediately after swallowing function barrier-free surgery	Fast on the day after surgery and start a fluid diet on the first day after surgery
Rehydration after surgery	No additional rehydration is required except for the necessary antibiotics	Rehydration 500 ~ 2 000 mL during 2 days fasting after surgery
Postoperative activity	Provide conditions to assist the patient with 6 hours bed-out activities after surgery	Volunteer or assist in passive activities

Intervention group participants received ERAS combined with low-frequency pulsed electronic bladder therapy instrument after surgery 6 hours. the operation is as follows: The nurse will be 4 pieces of electrodes attached to the corresponding position. Throughout the treatment, the parameters are gradually increased from a small density, small intensity. Ask the patient how they feel when they feel strong enough to be stimulated until the maximum tolerance is reached and the parameters are guaranteed to increase. Typically, the intensity value is higher than or equal to the density value, the intensity is 32 to 50, the density is 16 to 30, each treatment 40 min. During specific treatments, help patients open their urethra sphincter, encourage them to keep urinating, and, if necessary, pick up pots or urinals.

We use SPSS 20.0 software for analysis.  $\chi^2$  test or Fisher exact probability method was used for the comparison of rates; The measurement data are tested by t-test.  $P < 0.05$  was statistically significant.

## 3. Result

During the study period, 200 patients were recruited. Twenty-eight patients were excluded according to the exclusion criteria. All 172 remaining patients were eligible for the study. As shown in Table 2, intervention group had better outcome in time of first exhaust, time of activity out of bed, and time of hospital stay compare with control group, that the results were significantly different ( $p < 0.05$ ).

**Table 2.** Time of first exhaust, time of activity out of bed, and time of hospital stay between two groups.

	Time of first exhaust (hour)	Time of activity out of bed (hour)	Time of hospital stay (hour)
Intervention group (n =86)	8.6±0.5	12.2±2.2	18.2±3.4
Control group (n = 86)	16.3±0.9	17.4±2.2	23.2±3.6
t	8.461	9.448	8.772
P value	< 0.05	< 0.05	< 0.05

As shown in Table 3, degree of wound pain was lower in intervention group than in control group. Compared with control group, NRS scores in preoperative, six hours after surgery, and 24 hours after surgery were lower in intervention, that the results were significantly different.

**Table 3.** Degree of wound pain of patient by numerical rating scale (NRS).

	Preoperative	Six hours after surgery	24 hours after surgery
Intervention group (n =86)	2.3±2.3	3.1±0.6	2.8±0.6
Control group (n = 86)	2.4±1.6	3.5±0.8	3.3±0.7
t	7.445	7.951	12.644
P value	< 0.05	< 0.05	< 0.05

## 4. Discussion

The two main results of our study can be summarized as follows. First, the nursing intervention of ERAS combined with low-frequency pulsed electronic bladder therapy instrument had better effect for patients who received PPH compare with traditional nursing intervention. Finally, degree of wound pain of patient was lower in intervention group than in control group.

Due to the abundance of blood vessels and nerves around the anus and rectum, there will be pain, urine retention and other complications for a long time after hemorrhoids surgery, which seriously affects the physical and mental health of patients [13]. Based on the guidance of the concept of rapid recovery, the medical staff attaches importance to the patients' physical and mental feelings, and prophylactic use of analgesic measures. As a result, patients' pain was significantly reduced. Based on the guidance of the concept of rapid recovery, the medical staff attaches importance to the patients' physical and mental feelings, and prophylactic use of analgesic measures. As a result, patients' pain was significantly reduced. Medical staff provide oral glucose or salt water to patients before surgery to alleviate hunger and thirst and other bad feelings. In addition, limiting the amount of fluid and planning the diet of patients after surgery is conducive to early recovery of patients.

Uroschisis cases patients' pain after PHH, because it causes abdominal pain and bloating, that it is postoperative complications of PPH [14]. The nursing intervention which was ERAS combined with low-frequency pulsed electronic bladder therapy instrument reduced risk of uroschisis event. low-frequency pulsed electronic bladder therapy instrument can increase the contractibility of the bladder detrusor muscle, make the pelvic floor muscle and fascia produce regular movement, thus improving the situation of bladder mucosal congestion, non-invasive operation can promote patients to be able to successfully urinate, avoid urinary system infection [15]. The intervention group started with low-frequency bladder therapy

instrument 6 hours after surgery, while the control group started with induced urination on the basis of traditional nursing. Compared with the control group, the intervention group had shorter first urination time and shorter hospital stay

In limitation, our subject were patients who received procedure for prolapse and hemorrhoids, so it is not known whether our results are application to the patients other treatment.

In conclusion, ERAS combined with low-frequency pulsed electronic bladder therapy instrument can reduce wound pain of patient, and it speeds patient recovery, promotes early urination after surgery, reduces the risk of urinary retention, and shortens the length of hospital stay.

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