Evaluation of Clinical Application of ERAS Concept in Perioperative Nursing of HoLEP Patients

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Abstract [**Objectives**] To observe the application effect of the concept of accelerated recovery after surgery (ERAS) on patients undergoing trans-urethral holmium laser enucleation of prostate (HoLEP) during perioperative period. [**Methods**] HoLEP patients with benign prostatic hyperplasia admitted to the Department of Urology, Affiliated Hospital of Jinggangshan University from June to December in 2022 were divided into the observation and control group. 40 patients in the control group were given perioperative routine nursing, while 40 patients in the observation group were given perioperative systematic nursing under the concept of ERAS. The nursing effect of different measures were evaluated. [**Results**] The perioperative related indexes of patients in the observation group were lower than those in the control group ($P<0.05$). The postoperative feeding, exhaust, spontaneous urination, getting out of bed and hematuria stop time of patients in the observation group were all shorter than those in the control group ($P<0.05$). The IPSS score and RUV of patients in the observation group were significantly lower than those in the control group, while their Qmax was higher than that in the control group ($P<0.05$). The incidence of postoperative complications in the observation group was lower than that in the control group ($P<0.05$). [**Conclusions**] The application of perioperative systematic nursing under ERAS concept in HoLEP patients can promote patients' rapid recovery and reduce their complications.

Key words Prostatic hyperplasia, Accelerated recovery after surgery, Perioperative nursing

1 Introduction

Benign prostatic hyperplasia (BPH) is a common benign disease in elderly men, and its incidence is increasing year by year. Trans-urethral holmium laser enucleation of prostate (HoLEP) is an important surgical method for BPH. Compared with traditional surgery, HoLEP has the advantages of smaller wound, faster recovery and fewer complications. With the progress of surgical methods, traditional conventional nursing intervention has been unable to meet the requirements of the minimally invasive surgery era[1]. Therefore, improving postoperative nursing intervention is of great significance to promote the rehabilitation of patients.

In recent years, the concept and path of enhanced recovery after surgery (ERAS) have been popularized and applied in China. ERAS is a core concept with rapid rehabilitation as its main purpose. Clinical practice guidelines report that under the concept of ERAS, the implementation of targeted systemic perioperative nursing for HoLEP patients can effectively alleviate various stress reactions in the perioperative period, reduce postoperative complications, shorten hospital stay and promote rehabilitation[2-3]. This research group has achieved good results in the study, and they will be reported as below.

2 Data and methods

2.1 General information The information of 80 BPH patients who underwent surgical treatment in the Department of Urology, Affiliated Hospital of Jinggangshan University from June to December in 2022 were collected, and they were divided into the observation group (40 cases) and control group (40 cases) according to the random number table method. There were no statistically significant differences in their age, prostate volume, prostate specific antigen (PSA), preoperative international prostate symptom score (IPSS), preoperative maximum urine flow rate (Qmax), preoperative residual urine volume (RUV), and quality of life (QOL) between the two groups ($P>0.05$), indicating that the two groups were comparable (Table 1).

Inclusion criteria of the study subjects: (i) all patients met the diagnostic criteria for prostate hyperplasia in the *Chinese Guidelines for Diagnosis and Treatment of Urological Diseases* (2014 edition)[4] and various surgical indications; (ii) all patients could be followed up for 3 months. Criteria for exclusion of cases: (iii) it was complicated by prostate cancer and prostatitis; (iv) it was complicated by overactive bladder and detrusor weakness; (v) it was complicated by bladder tumor and history of prostate surgery; (vi) it was accompanied by neurogenic bladder; (vii) it was accompanied by urethral stenosis and/or bladder neck contracture; (viii) any form of urinary incontinence has been present before surgery; (ix) other researchers were not suitable to participate in this study. Criteria for discontinuation and exclusion: (i) patients, who suffered serious adverse events and serious complications in the trial, need to adopt emergency discontinuation measures; (ii) patients had poor compliance, and did not cooperate with the treatment as prescribed. All patients and their families gave informed consent, and this study was reviewed and approved by the Medical Ethics Committee of Affiliated Hospital of Jinggangshan University.

2.2 Experimental method In the control group, routine nursing operations were conducted in the perioperative period, including preoperative health education, improvement of preoperative routine examination, cleaning and enema on the night of the first day before surgery, fasting 12 h before surgery, water prohibition 6 h before surgery, monitoring of changes in vital signs, and close observation of disease condition. Patients in the observation group

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Table 1 Comparison of baseline data between the two groups ($n=40$)

Group	Age	Prostate volume/mL	PSA//ng/mL	IPSS//point	QOL//point	Qmax/mL/s	PVR//mL
Observation	71.46±6.56	68.24±14.30	3.50±1.13	21.63±2.51	5.12±1.13	8.45±3.03	112.70±26.27
Control	71.20±6.23	67.59±15.26	3.42±1.21	21.98±2.80	5.08±0.97	9.01±2.70	111.54±28.07

were given systematic perioperative nursing according to the concept of accelerated rehabilitation surgery. That is, when the patient was diagnosed with BPH and planned to undergo HoLEP, the medical team composed of the doctor in charge, anesthesiologist and responsible nurse conducted holistic and continuous individualized perioperative management according to the patient's condition and ERAS protocol.

2.2.1 Preoperative nursing. According to the nursing literature of HoLEP evidence-based medicine, the individualized nursing plan was developed. Each patient's specific condition and psychological status were assessed objectively. Besides, they were given targeted psychological counseling, and provided with scientific and reasonable suggestions. The general procedure of the operation, the key points requiring patients' cooperation and the possible psychological and physiological discomfort during and after the operation were introduced to patients in plain language. Patients were instructed to strengthen preoperative nutritional support, and rationally supplement food containing protein and vitamins to avoid excessive intestinal irritation. Active communication with patients was conducted to answer their doubts, relieve their anxiety, and encourage them to have a positive and optimistic attitude towards the operation.

2.2.2 Intraoperative nursing. According to the surgical requirements, the target stone cutting position was taken, and a soft pillow was placed in the throat to establish the vein channel. The intraoperative coordination was done, and the perfusion was heated to about 36 ℃ to keep warm. The intraoperative hemostasis should be timely and effective, and the intraoperative residual tissue was removed.

2.2.3 Postoperative nursing. The changes in vital signs of patients were closely observed, and they were given intravenous pain relief pump or oral non-street anti-inflammatory drugs for pain relief. 37 ℃ flushing solution was prepared for target irrigation, and the catheter and drainage tubes were squeezed regularly to facilitate timely discharge of bleeding clots. The color of the flushing solution was observed, and hemostatic measures were taken in time for the occurrence of red flushing solution due to active bleeding. 6 h after the operation, patients drank a little water, and their diet changed from liquid diet and semi-liquid diet to normal diet gradually transition to keep stool unobstructed.

2.3 Observation indicators and evaluation method (i) Patients' perioperative indicators (total operation time, glandular stripping time, glandular resection time, intraoperative blood loss, bladder irrigation time, catheter indwelling time and postoperative hospital stay) were compared between the two groups. (ii) Their postoperative recovery indexes were compared between the two groups, including IPSS score, RUV and Qmax 1 and 5 days after surgery. (iii) The incidence of patients' postoperative complications was compared between the two groups.

2.4 Statistical analysis SPSS 20.0 statistical software was used for statistical analysis of data. Chi-square test or Fisher exact test were used for counting data. Measurement data were expressed as $\bar{x}\pm s$, and t-test or Wilcoxon rank sum test were used to compare continuous variables. $P<0.05$ meant the difference was statistically significant.

3 Results and analysis

3.1 Comparison of perioperative relevant indicators between the two groups There were statistically significant differences in perioperative relevant indicators between the observation group and the control group ($P<0.05$) (Table 2).

Table 2 Comparison of perioperative relevant indicators between the two groups ($\bar{x}\pm s$, $n=40$)

Group	Total operation time//min	Glandular stripping time//min	Glandular resection time//min	Intraoperative blood loss//mL	Bladder irrigation time//h	Catheter indwelling time//h	Postoperative hospital stay//d
Observation	85.56±17.46▲	32.19±9.98▲	51.37±18.15▲	61.57±19.15▲	20.61±5.51▲	86.70±22.16▲	5.51±1.42▲
Control	93.27±15.09	36.87±8.78	57.40±19.03	70.37±18.70	25.70±6.04	93.54±21.28	6.77±1.51

Note: ▲ means $P<0.05$. The same in tables 2 and 3.

3.2 Comparison of postoperative recovery indicators between the two groups The postoperative feeding, exhaust, spontaneous urination, getting out of bed and hematuria stop time of patients in the observation group were all shorter than those in the control group, and the differences were statistically significant ($P<0.05$) (Table 3).

Table 3 Comparison of postoperative recovery indicators between the two groups ($\bar{x}\pm s$, $n=40$)

Group	Postoperative feeding//h	Anal exhaust//h	Spontaneous urination//d	Getting out of bed//d	Hematuria stop time//d
Observation	12.23±1.05	27.65±3.81	3.54±0.65	3.52±0.62	3.27±0.81
Control	8.66±0.81▲	23.21±2.76▲	2.49±0.37▲	1.48±0.19▲	4.54±0.92▲

3.3 Comparison of postoperative IPSS score, RUV and Qmax between the two groups There was no significant difference in IPSS score, RUV and Qmax between the two groups 1 d after surgery ($P>0.05$). 5 d after surgery, the IPSS score and

RUV of patients in the observation group were significantly lower than those in the control group, while the Qmax of patients in the observation group was higher than that in the control group, and the differences were statistically significant ($P<0.05$) (Table 4).

3.4 Comparison of postoperative complications between the two groups The incidence of postoperative complications in the observation group was 10%, significantly lower than that in the control group (25%), and the differences were statistically significant ($P<0.05$) (Table 5).

Table 4 Comparison of postoperative IPSS score, RUV and Qmax between the two groups ($\bar{x}\pm s$, $n=40$)

Group	Postoperative time//d	IPSS score//point	RUV//mL	Qmax//mL
Observation	1	15.23±1.16	56.65±8.24	4.28±0.37
	5	11.42±1.29	31.46±4.18	17.95±1.56
Control	1	14.98±1.10*	57.13±9.04*	4.30±0.39*
	5	9.35±0.83▲	19.37±3.50▲	24.13±2.24▲

Note: ▲ means $P<0.05$, and * means $P>0.05$.

Table 5 Comparison of incidence of postoperative complications between the two groups ($n=40$)

Group	Urinary retention	Hemorrhage	Narrow external urethral orifice	Temporary urinary incontinence	Difficulty in spontaneous urination	Infection	Total number (incidence)
Observation	2	1	1	3	2	1	10 (25%)
Control	1	0	1	1	1	0	4 (10%)

4 Discussion

Epidemiological investigation shows that prostate hyperplasia has a high incidence, and the total incidence of prostate hyperplasia in the elderly over 60 years old is more than 60%, so it is a common factor causing bladder outlet obstruction and affecting the quality of life of elderly men[5]. Surgery is an important treatment for urinary tract obstruction. In recent years, with the gradual maturity of HoLEP technology, it has gradually replaced other surgery methods and become one of the gold standards for minimally invasive BPH treatment due to its characteristics of less bleeding, less pain, short operation time, fast recovery, and fewer complications[6-7]. HoLEP surgery is simple in operation, causes little invasive injury, and can effectively eliminate urinary tract obstruction, but the bladder function is difficult to recover in a short time after surgery, so it is of great significance to strengthen postoperative rehabilitation.

In recent years, a large number of studies[8-9] have confirmed the clinical feasibility and superiority of ERAS concept. Based on evidence-based medical evidence, ERAS significantly reduces the occurrence of postoperative complications through a series of multimode and interdisciplinary perioperative treatment protocols throughout the entire treatment process and optimization of clinical pathways involved in perioperative management[10]. It is one of the important development directions in the surgical field in the future. With the support of theory and practice, ERAS provides patients with nursing guidance and intervention methods that can better help patients to carry out early postoperative rehabilitation during the perioperative period, as well as high-quality nursing guidance for early postoperative rehabilitation[11].

Accelerated rehabilitation surgery is a multidisciplinary collaborative model, and adopts a series of optimized management measures proved effective by evidence-based medicine in the perioperative period, so as to reduce the psychological and physiological traumatic stress reactions of patients and the occurrence of complications, shorten the length of hospital stay, and reduce the risk of readmission and death and medical costs[12]. Driven by the concept of ERAS, accelerated rehabilitation nursing has become a new nursing model, and has been widely used in clinical practice along with the development of ERAS. Its core is that by adopting effective nursing theories that have been proven by evidence-based medicine[13], namely formulating effective nursing programs in the perioperative period, patients are given a series of nursing interventions to reduce postoperative complications and promote the rehabilitation of patients[14]. The results of this study show that the incidence of postoperative complications in the observation group was significantly lower than that in the control group ($P<0.05$), and the IPSS score and RUV in the observation group were also significantly lower than those in the control group; the Qmax in the observation group was higher than that in the control group ($P<0.05$), while the postoperative feeding, exhaust, spontaneous urination, getting out of bed and hematuria stop time of patients in the observation group were shorter than those in the control group ($P<0.05$). The above analysis indicates that nursing measures based on ERAS concept had better effects in the HoLEP treatment of BPH patients, and can promote the recovery of patients and reduce the postoperative adverse reactions and complications of patients.

In summary, the implementation of nursing interventions under the ERAS concept in the perioperative nursing of HoLEP patients can significantly shorten postoperative eating, exhaust, voluntary urination, getting out of bed and other postoperative recovery time, improve postoperative prostate symptoms earlier, reduce RUV, increase Qmax, and decrease the incidence of complications.

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release of histamine inflammatory mediators. IgE is also involved in the formation of abnormal immune response and an important part of inflammation in the skin, and it also activates mast cells and causes them to release histamine, leukotriene and other mediators[15]. The increased level of anti-IgE antibody in patients indicated that IgE involved in the formation of abnormal skin immune response was effectively inhibited. Chloramphenicol prednisone linimentum can inhibit mast cell activation in this inflammatory response, while cetirizine hydrochloride, as an H1 receptor antagonist, can inhibit mast cell and basophil degranulation, both of which play an important role in inhibiting mast cell degranulation release of inflammatory mediators and alleviating acute inflammatory skin injury of eczema. In the drug composition of Chuanbai antipruritic lotion, "*Portulaca oleracea*, snake seed, *Sophora flaveskeli*, white moss skin, *Radix Nepeta*, Baibu, honeycomb, mugwort leaf, Chuanligong, locust twig, Xihe willow, willow twig, *Tribulus tribulus*, peach twig" are used together to make "water film" wet compress, and the formed "water film" wet package can be absorbed through the skin to jointly play the effect of "clearing heat, drying dampness and relieving itch"[16].

To sum up, Chuanbai antipruritic lotion "water film" wet compress combined with chloramphenicol prednisone liniment treatment has played a role in treating both symptoms and root causes, the clinical effect of patients is increased with no allergy, drug rash, *etc.*, to achieve the purpose of "decreasing side effects and enhancing effect" in safe drug use.

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