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Original Article

Evidence-based nursing for patients with prostate hyperplasia after holmium laser enucleation

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Abstract: Purpose: The current study aimed to investigate the effects of Evidence-Based Nursing (EBN) on Benign Prostatic Hyperplasia (BPH) patients after Holmium Laser Enucleation of Prostate (HoLEP). Methods: A total of 122 BPH patients, treated with HoLEP, were enrolled in this randomized, controlled, parallel, and single-blinded study. They were divided into group A (N = 61) and group B (N = 61). Group A received EBN intervention during the perioperative period, while group B underwent routine nursing intervention. Severity levels of prostatic symptoms, before and after nursing, were assessed using the International Prostate Symptom Scale (IPSS). Pain levels at 1, 3, and 7 days after surgery were evaluated using the Visual Analogue Scale (VAS). Hospitalization days, quality of life, incidence of complications, and nursing satisfaction levels of the two groups were recorded. Results: Repeated measures analysis of variance showed significant differences in VAS scores between groups A and B at 1, 3, and 7 days after surgery ($P < 0.001$). VAS scores of Group A, on days 1, 3, and 7 after surgery, were significantly lower than those of Group B ($P < 0.001$). Hospitalization days of Group A were significantly shorter than those of Group B ($P < 0.001$). IPSS scores of Group A and Group B, after nursing, were significantly lower than scores before nursing ($P < 0.001$). IPSS scores of Group A were significantly lower than scores of Group B ($P < 0.001$). QOL scores of Group A were significantly lower than scores of Group B ($P < 0.001$) after nursing. Incidence of complications in Group A was significantly lower than that in Group B ($P = 0.019$). Nursing satisfaction levels of Group A were significantly higher than those in Group B ($P = 0.041$). Conclusion: EBN intervention for BPH patients after HoLEP during the perioperative period can reduce postoperative pain, shorten hospitalization times, effectively relieve the severity of prostate symptoms, reduce rates of postoperative complications, improve the quality of life, improve nursing satisfaction, and promote patient recovery.

Keywords: Benign prostatic hyperplasia (BPH), perioperative period, holmium laser enucleation of prostate, evidence-based nursing

Introduction

Benign Prostatic Hyperplasia (BPH) causes urinary dysfunction in middle-aged and elderly men, having adverse effects on patient lives [1]. Aging and abnormal testicular function have been considered the main causes of BPH. With an increase in age, as well as levels of estrogen, testosterone, and dihydrotestosterone, the body loses balance. This may result in sex hormone disorders in male patients, leading to hypertrophy of the prostate, narrowing of urethral orifice, and greater micturition resistance. This further leads to urethral obstruction and voiding dysfunction, which seriously affect bladder and urine emptying [2, 3]. Holmium Laser Enucleation of Prostate (HoLEP) is currently one of the most accurate methods for treatment of BPH. It has similar clinical efficacy with open surgery, but also with the advantages of minimally invasive surgery [4]. HoLEP uses a holmium laser energy soft fiber to shoot to the pathogenic area and cut the prostate. It then removes and smashes the hyperplastic tissue from the diolame, finally excreting it from the urethra. Over the course of treatment, HoLEP has several advantages. However, a variety of stress reactions, such as anesthesia and surgical trauma, may cause and aggravate underlying diseases. Many postoperative patients still have sexual dysfunction, hemorrhaging, and bladder neck stenosis, which seriously affect

quality of life levels [5, 6]. HoLEP requires nursing cooperation before, during, and after surgery. With improvements in medical levels, routine nursing measures have difficulty in meeting the multi-functional and multi-level need for nursing services [8]. Therefore, a more effective nursing mode is necessary for BPH patients during the perioperative period, promoting recovery.

Evidence Based Nursing (EBN) is a new nursing mode based on clinical evidence. When planning nursing activities, nursing staffs scientifically and prudently use study conclusions and evidence, combined with clinical nursing experience and patient opinions, to provide corresponding nursing measures [7]. EBN has been widely used in various fields of nursing practice in recent years. It has been played a very important role in improving the quality of nursing services [8-10]. In the process of EBN, the best evidence is obtained from the study. Patients will be given individualized nursing modes and corresponding nursing measures, according to the professional judgment of nursing staff and patient requirements, as well as the situation of application evidence [11].

At present, there are many studies concerning the clinical application of EBN. Results have shown that EBN plays a better role in improving prognosis during the perioperative period for various diseases [12, 13]. However, studies concerning the application value for BPH patients during HoLEP in the perioperative period are very limited. Implementing EBN intervention on BPH patients, the current study aimed to provide a feasible clinical nursing mode for BPH patients, promoting rehabilitation.

Materials and methods

General data

A total of 122 BPH patients, treated with HoLEP, were selected as research subjects. According to the principles of randomized-controlled, parallel, and single-blinded studies, they were divided into group A (N = 61) and group B (N = 61). Group A received EBN intervention during the perioperative period, while group B underwent routine nursing intervention. Group A was aged 61-82 years old, with an average of (71.18±6.37) years and an average course of disease of (26.09±3.28) months. Group B was aged 63-83 years, with an average age of (70.31±8.15) and an average course of disease of (25.34±3.86) months. Inclusion criteria: BPH was confirmed by B-ultrasounds, rectal digital examinations, and uroflowmetry; Patients were expected to be hospitalized for 3-7 days after HoLEP treatment; Showed clinical symptoms of progressive dysuria. Exclusion criteria: Patients with severe liver and kidney dysfunction, pulmonary tuberculosis, connective tissue disease, endocrine and metabolic disease, neurological disease, hematopoietic dysfunction, and immune disease; Mental diseases or a family history of mental illness. The patients and their families provided informed consent before inclusion in the study. The study was approved by the Ethics Committee.

Nursing methods

Routine nursing: Corresponding nursing strategy before, during, and after surgery was implemented. Patient care was based on individual situations and HoLEP duration times. Patient physical conditions were fully studied before surgery. They were given an explanation concerning the disease. Patient and families were informed about matters needing attention. Postoperative urinary tract infections were observed and patients were prevented from catching colds.

EBN: Establishment of the EBN nursing team: Skilled nurses of the Undergraduate Department were recruited, together with the Deputy Director Nurse and Supervisor Nurse. They formed the EBN team headed by the Head Nurse. The director carried out evidence-based nursing related knowledge training for the members of the nursing team. The director explained in detail the concept, meaning, implementation method, and implementation steps of EBN, aiming to improve the execution ability of the EBN members.

Data of successful nursing experiences was collected according to individual situations of patients. This data was combined into nursing practice. Specific nursing intervention measures based on previous successful experiences and scientific theory were carried out. The nursing plan was constantly adjusted, according to patient situations, until the best individualized nursing mode was achieved.

Preoperative care: The patients were guided to take medicine, according to doctor's instructions, and urination after medicine was observed. Moreover, α-receptor blockers (Tamsulosin) may cause hypotension, dizziness, nausea, and other adverse reactions. Thus, it should be taken before bedtime. Patients were informed of the need for long-term use of the drug, considering the slow efficacy of 5 alpha-reductase inhibitors. Psychological nursing: Psychological changes of the patients were observed. Successful cases of treatment were explained for patients with surgical concerns. Additionally, patients were encouraged to seek psychological support from family members. Preoperative preparation: BPH patients are mostly elderly. Thus, the endurance capacity of patients for surgery should be assessed before the surgery. Preoperative antibiotics were applied to prevent infections and enemas were given on the night before surgery, aiming to avoid postoperative bleeding caused by defecation. Postoperative care: Patient condition changes after surgery were closely observed, including mental consciousness, spirit, oxygen saturation, blood pressure, and other vital signs. Postoperative complications, such as nausea, vomiting, and comas were treated and recorded. For serious cases, pulmonary edema, cardiac failure, or brain edemas may appear. These should be given oxygen inhalation in a timely manner. Dehydration drugs or diuretics should be given according to doctor recommendations. Patients were encouraged to practice sphincter exercises for unobstructed defecation, aiming to avoid bleeding due to increased abdominal pressure in defecation. Anal exhaust and enemas were prohibited in early stages to avoid prostatic crypt bleeding. Pipeline care: The catheter was fixed and the drainage tube was squeezed regularly to avoid blocking. The volume, color, and characteristics of the drainage liquid were closely monitored. The speed of the flush fluid was adjusted according to requirements. Diet nursing: Postoperative patients received food rich in nutrition and vitamins and digestible food to prevent constipation. Spicy food was prohibited. During the indwelling catheter period, patients were reminded to drink much water to dilute the urine and avoid urinary tract infections. Postoperative nursing staffs repeatedly emphasized the harmfulness of constipation. Elderly patients often suffer constipation, but overexertion may cause prostatic wound scab tears and hemorrhoids. Habitual constipation patients were given oral laxatives or use glycerin enemas to prevent constipation [14]. Postoperative health guidance: Lifting something heavy or sitting for a long time within 1-2 months after HoLEP was avoided. Vigorous exercise was prohibited, including sex and running, to prevent secondary hemorrhaging. If enuresis occurred, patients performed sphincter exercises to restore urethral sphincter function.

Outcome measures

Primary outcomes: Visual Analogue Scale (VAS) [15] scores were used to assess pain degrees at 1, 3, and 7 days after surgery. Scores ranged from 0 to 10, with 0 indicating no pain and 10 indicating the most severe pain. International Prostate Symptom Scale (IPSS) [16] scores were adopted to assess severity of prostatic symptoms before and after two months of nursing care. This included the feeling of incomplete urination in the past month, two instances of micturition within 2 hours, urination interruption, urgent urination, thinning of urinary line, difficult micturition, and nocturnal enuresis, with a total of 7 items. Scores of each item ranged from 0 to 5. A score of 0 indicates no symptoms, less than 1/5 means 1 point, less than 1/2 means 2 points, about 1/2 means 3 points, more than 1/2 means 4 points, and almost always means 5 points. Scores between 0 and 7 indicate mild symptoms. Scores between 8 and 19 indicate moderate symptoms. Scores between 20 and 35 indicate severe symptoms. Quality of Life scale (QOL) scores were used to evaluate the effects of nocturia, urgent urination, frequent micturition, and incontinence on life quality of patients after 2 months of nursing. Patients were divided into seven levels according to patient urination situations. Scores of each level ranged from 0 to 6. A score of 0 means very good. A score of 1 means good and a score of 2 means more than half of satisfaction. A score of 3 means about half of satisfaction and a score of 4 means more than half of dissatisfaction. A score of 5 means dissatisfaction and a score of 6 means painful. Incidence of nursing complications, including hematuria, urinary tract infections, and urethral stricture, were recorded.

Table 1. Baseline data of patients in group A and group B [n (%)]/(x±sd)

Category	Group A (n = 61)	Group B (n = 61)	t/χ^2	P
Age	71.18±6.37	70.31±8.15	0.657	0.513
Course of disease (month)	26.09±3.28	25.34±3.86	1.156	0.250
History of smoking			0.823	0.364
Yes	31 (50.82)	26 (42.62)		
No	30 (49.18)	35 (57.38)		
Drinking history			0.834	0.361
Yes	24 (39.34)	29 (47.54)		
No	37 (60.66)	32 (52.46)		
Combined with hypertension			0.300	0.584
Yes	36 (59.02)	33 (54.10)		
No	25 (40.98)	28 (45.90)		
Marital status			0.047	0.828
Unmarried sex life	3 (4.92)	1 (1.64)		
Married	48 (78.69)	51 (83.61)		
Divorced or widowed	10 (16.39)	9 (14.75)		
Place of residence			1.002	0.317
City	41 (67.21)	46 (75.41)		
Rural	20 (32.79)	15 (24.59)		
Educational level			0.286	0.593
Primary school	8 (13.11)	7 (11.48)		
Middle school	9 (14.75)	12 (19.67)		
High school	19 (31.15)	22 (36.07)		
The University	25 (40.98)	20 (32.79)		
Intraoperative blood loss (mL)	88.63±26.87	87.63±25.83	0.210	0.834
Bladder continuous washing time (d)	1.29±0.56	1.28±0.48	0.106	0.916
ALT (U/L)	27.58±12.67	28.07±11.42	0.224	0.823
AST (U/L)	16.44±6.91	15.25±5.47	1.055	0.294
Glu (mmol/L)	6.01±0.93	6.11±1.02	0.566	0.573

Secondary outcomes: Nursing satisfaction questionnaires [17] were used to evaluate patient satisfaction levels after two months of nursing. Scores below 60 indicate dissatisfaction and scores between 60 and 79 indicate basically satisfied. Scores between 80 and 90 indicate satisfaction and scores above 90 indicate very satisfied. Satisfaction = (Basic Satisfaction + Satisfaction + Quite Satisfaction)/ Total Amount × 100%.

Statistical methods

SPSS18.0 (from Analytical Software (Shanghai) Co., Ltd) was used for statistical analysis. Measurement data were expressed as mean ± standard deviation ($\bar{x}$±s). For intragroup before-after comparisons, pairwise t-tests were used. For between-group comparisons, independent t-tests were used. Comparisons of multiple time points were performed by repeated measures analysis of variance, verified by Bonferroni's tests. Count data are expressed by [n (%)]. Comparisons of these data were conducted with Chi-square tests. $P < 0.05$ indicates statistical significance.

Results

Baseline data

There were no significant differences between Group A and Group B concerning age, course of disease, smoking history, drinking history, hypertension, marital status, place of residence, educational level, intraoperative blood loss, duration of bladder irrigation or alanine transaminase (ALT), AST, and Glu levels ($P > 0.05$) (**Table 1**).

VAS scores after surgery

VAS scores of Group A at 1, 3, and 7 days after surgery were 5.41±1.22, 3.17±1.61, and

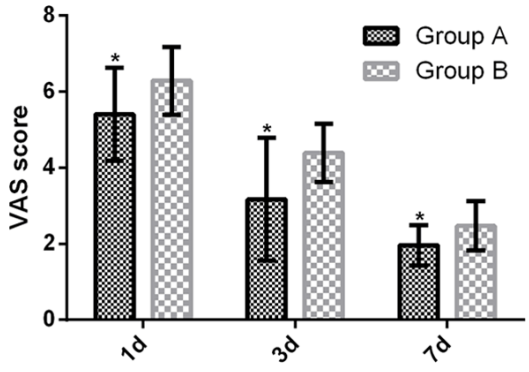

Figure 1. VAS Scores of the two groups at 1, 3, and 7 days after surgery. VAS scores of Group A were significantly lower than scores of Group B (t = 7.537, P < 0.001). Remarks: Compared with Group B, *P < 0.001.

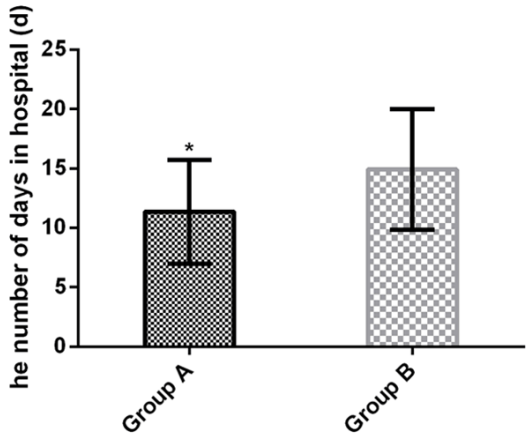

Figure 2. Hospitalization days after nursing. Hospitalization days after nursing of Group A were significantly less than those in Group B (t = 4.161, P < 0.001). Note: Compared with Group B, *P < 0.001.

1.96±0.53 points, respectively. Scores of Group B were 6.28±0.89, 4.39±0.76, and 2.47±0.65 points, respectively. Repeated measures analysis of variance showed significant differences in VAS scores between groups A and B on days 1, 3, and 7 after surgery (F = 25.510, P < 0.001; F = 100.000, P < 0.001). VAS scores of Group A were significantly lower than scores of Group B (t = 4.500, P < 0.001; t = 5.352, P < 0.001; t = 4.749, P < 0.001) (**Figure 1**).

Hospitalization days after nursing

Hospitalization days of Group A were (11.34±4.37) days after nursing, while hospitalization days of Group B were (14.91±5.08) days after nursing. Hospitalization days after nursing in Group A were significantly less than those in Group B (t = 4.161, P < 0.001) (**Figure 2**).

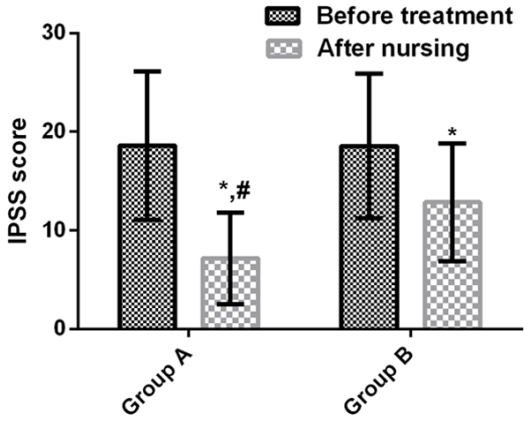

Figure 3. IPSS scores before and after nursing. After nursing, IPSS scores of both Group A and Group B were significantly lower than scores before nursing (t = 10.100, P < 0.001; t = 4.725, P < 0.001). IPSS scores of Group A after nursing were significantly lower than scores of Group B (t = 5.867, P < 0.001). Note: *P < 0.001 compared to pre-nursing, #P < 0.001 compared with group B after nursing.

IPSS scores before and after nursing

IPSS scores of Group A were (18.61±7.52) before nursing and (7.18±4.64) after nursing. IPSS scores of Group B were (18.57±7.31) before nursing and (12.86±5.97) after nursing. There were no significant differences in IPSS scores between Group A and Group B before nursing (P > 0.05). After nursing, IPSS scores of both Group A and Group B was significantly lower than scores before nursing (t = 10.100, P < 0.001; t = 4.725, P < 0.001). IPSS scores of Group A after nursing were significantly lower than those of Group B (t = 5.867, P < 0.001) (**Figure 3**).

QOL scores after nursing

After nursing, the QOL score of Group A was (2.16±0.28). The QOL score of Group B was (3.28±0.35). The QOL score of Group A after nursing was significantly lower than that of Group B (t = 7.537, P < 0.001) (**Figure 4**).

Incidence of complications

In Group A, 1 patient had hematuria (1.64%), 2 patients had urinary incontinence (3.28%), and 1 patient had urethral stricture (1.64%). In

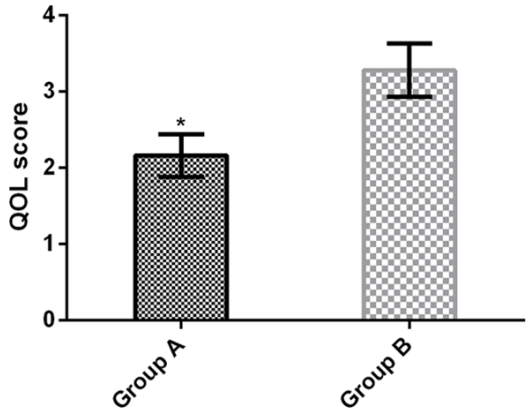

Figure 4. QOL scores after nursing. The QOL score of Group A after nursing was significantly lower than that of Group B (t = 7.537, P < 0.001). Note: Compared with Group B, *P < 0.001.

Group B, 3 patients had hematuria (4.92%), 5 patients had urinary incontinence (8.20%), 4 patients had urethral stricture (6.56%), and 1 patient had a urinary tract infection. The total incidence of complications was 21.31%. Results indicated that the complications rate in Group A was significantly lower than that in Group B (χ^2 = 5.536, P = 0.019) (**Table 2**).

Nursing satisfaction levels of the two groups

In Group A, 36 patients were very satisfied (59.02%), 13 patients were satisfied (21.31%), 7 patients were basically satisfied (11.48%), and 4 patients were unsatisfied (8.20%). Total nursing satisfaction was 91.80%. In Group B, 25 patients were very satisfied (40.98%), 15 patients were satisfied (24.59%), 8 patients were basically satisfied (13.11%), and 13 patients were unsatisfied (21.31%). Total nursing satisfaction was 78.69%. Satisfaction levels of patients in Group A were significantly higher than those in Group B (χ^2 = 4.171, P = 0.041) (**Table 3**).

Discussion

BPH is one of the main causes of dysuria in males. Estrogen and dihydrotestosterone levels change in aging bodies. This increases urethral resistance and eventually causes dysuria [18]. Clinical symptoms of BPH depend on obstructive grades, concurrent infections, and lesion development rates. Prostate plasma enucleation or plasma resection treatment has been commonly used in surgery [19]. HoLEP is the currently the main method of treating BPH. The use of krypton laser direct fibers to cut tissues can effectively stop bleeding, prevent occurrence of incisions of blood vessels and penetration of the capsule in the cutting. This method offers less bleeding and less trauma. Patients need nursing during the perioperative period. Thus, choosing a good nursing model is important for BPH patients [20].

In recent years, with the development of evidence-based medicine, EBN has gradually been widely used in clinic. In the process of nursing implementation, nursing staffs should clearly and wisely combine scientific research conclusions and experience, as well as patient opinions, to obtain credible and valuable scientific research as evidence. Moreover, nursing staffs should observe underlying problems and make appropriate adjustments. Empirical analysis can be used to implement the best nursing intervention for patients [21].

Previous studies have shown that implementation of EBN can effectively prevent ventilator-associated pneumonia and improve the quality of clinical nursing [22]. Other studies have shown that EBN can improve health education satisfaction and nursing quality of elderly diabetic patients [23]. These studies have indicated the benefits of EBN on patients with various diseases. However, reports concerning EBN intervention on BPH patients after HoLEP are rare. A previous study carried out EBN intervention on BPH patients after HoLEP, mainly including preoperative preparation, postoperative preventive care, rehabilitation guidance, and all-around nursing intervention. Results showed that VAS scores, hospitalization days, IPSS scores, QOL scores, and incidence rates of complications in Group A were all significantly lower than those in Group B. Nursing satisfaction was significantly higher than that in Group B. Results suggest that EBN intervention can reduce postoperative pain, shorten hospitalization times, effectively alleviate the severity of prostate symptoms, reduce postoperative complications rates, improve the quality of life, improve nursing satisfaction, and promote early recovery during the perioperative period, helping to avoid postoperative complications and improve the quality of care [24]. Present results also indicate that implementation of EBN during the perioperative period can pro-

Table 2. Comparison of complication rates in group A and group B [n (%)]

Group	n	Hematuria	Urinary incontinence	Urethral stricture	Urinary tract infection	Complication rate (%)
Group A	61	1 (1.64)	2 (3.28)	1 (1.64)	0 (0.00)	6.56
Group B	61	3 (4.92)	5 (8.20)	4 (6.56)	1 (1.64)	21.31
χ^2	-	1.034	1.364	1.877	1.008	5.536
P	-	0.309	0.243	0.171	0.315	0.019

Table 3. Comparison of nursing satisfaction results between patients in group A and group B [n (%)]

Group	n	Very satisfied	Satisfaction	Basic satisfaction	Not satisfied	Satisfaction (%)
Group A	61	36 (59.02)	13 (21.31)	7 (11.48)	5 (8.20)	91.80
Group B	61	25 (40.98)	15 (24.59)	8 (13.11)	13 (21.31)	78.69
χ^2	-	-	-	-	-	4.171
P	-	-	-	-	-	0.041

mote the rehabilitation of patients. Although EBN can reduce postoperative complications, the current study did not perform QOL scores on patients before nursing, a major design flaw. Some patients still had symptoms of hematuria, urinary incontinence, and urethral stricture. Therefore, more successful cases of nursing experiences should be collected in future studies, aiming to reduce postoperative complications rates. In summary, BPH intervention on BPH patients during the perioperative period after HoLEP can reduce postoperative pain, shorten hospitalization times, effectively alleviate the severity of prostate symptoms, reduce postoperative complications rates, improve the quality of life, improve nursing satisfaction, and promote the early recovery of patients.

Disclosure of conflict of interest

None.

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