

Original Article

Effects of individual pain nursing intervention on pain improvement, stress indicators, negative emotions and nursing satisfaction in patients with acute nephrolith

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Abstract: Objective: This study was designed to analyze the effects of individual pain nursing intervention on pain management, stress indicators, negative emotions and nursing satisfaction of patients with acute nephrolith. Methods: In total, 97 patients with acute nephrolith admitted to our hospital were included as the study subjects and retrospectively analyzed based on the intervention. The control group contained 47 patients who were routinely nursed, and the observation group included 48 patients who were nursed based on the specific conditions in addition to those services provided to the control group. The 2 groups were compared for visual analogue scale (VAS) score, self-rating anxiety scale (SAS) score, self-rating depression scale (SDS) score and various physiological stress indicators and nursing satisfaction before and after intervention. Results: Compared with the control group, the observation group yielded significantly lower scores of VAS, SAS, SDS, heart rate, DBP and SBP ($P < 0.05$), and higher satisfaction (95.83% versus 74.47%) ($P < 0.05$). Conclusion: Individual pain nursing intervention is a method that deserves to be popularized for its advantages of reducing pain intensity and stress reactions, and improving negative emotions and nursing satisfaction of patients with acute nephrolith.

Keywords: Acute nephrolith, routine nursing, individual pain nursing, negative emotions, nursing satisfaction

Introduction

Nephrolith is a general disease mostly found in the urine system of young male adults due to the abnormal accumulation of crystalline materials such as cystine, uric acid, oxalic acid and calcium in the kidneys [1]. About 70% of the patients with nephrolith will suffer from paroxysmal lumbago and abdominal soreness and angina, while some may experience sharp pains, accompanied by symptoms such as blood in the urine, vomiting and nausea, significantly compromising the physical and mental health of patients [2, 3].

As one of the common symptoms of acute nephrolith, pain can give rise to negative emotions, including dysphoria, depression and anxiety of various degrees, which affects prognosis and treatment, and leads to medical disputes in some cases [4, 5]. To avoid setbacks from pain, enhanced pain intervention [6] based on a patients' actual condition is necessary, in

addition to effective measures for treatment. Individual pain nursing refers to a process of adopting targeted measures to relieve patients from as much pain as possible and reduce the incidence of various adverse emotions related to pain by identifying their cause, in order to effectively promote the recovery of patients [7, 8]. This study adopted individual pain nursing in addition to routine nursing in order to assist patients with acute nephrolith and explore its influence on pain management improvement, stress indicators, negative emotions and nursing satisfaction.

Previously, clinical intervention with patients with acute nephrolith was based on routine nursing intervention measures for emergency treatment, which is less extensive and less personalized. The present study is more innovative by performing individual nursing intervention with patients with acute nephrolith according to the characteristics of pain they suffer.

Materials and methods

Materials

In total, 97 patients with acute nephrolith being treated in our hospital were included as the study subjects, retrospectively analyzed and divided into 2 groups based on their intervention mode. The control group (n=47), 30 males and 17 females with an age range of 21 and 56 years, was routinely nursed while the observation group (n=48), 33 males and 15 females with an age range of 20 and 55 years, received individual pain nursing in addition to services to provided to the control group. (1) Inclusion criteria: patients with clear consciousness and an ability to describe their physiological and psychological feelings, and complaints of pains at the perineum, abdomen and waist in a medical visit were included; from whom or whose family members an informed consent was obtained. The study has been approved by the ethic committee of the Third Affiliated Hospital of Sun Yat-Sen University. (2) Exclusion criteria: some patients were excluded as they had malignant tumors, history of painkiller dependence and urinary tract deformity, or they withdrew from the study in the middle of its course.

Methods

All patients were nursed by paramedics with a title at or above primary nurse. For the control group, routine emergency nursing intervention was provided according to the processes of reception, triage, diagnosis, and formation of therapeutic regimens. Paramedics were required to treat patients with related drugs in strict accordance with the doctor's advices and offer them various routine nursing interventions in respect of diet and environment.

The observation group was further assisted with individual pain nursing intervention.

Pain assessment upon reception: Paramedics received patients in a friendly and caring manner, and learned about their pains by using the PQRST formula, where, P represents various factors contributing to the incentives, alleviation and aggravation of pains, Q rates pain quality, R where pain radiates, S pain severity, and T time pain started and ended, and its duration. In the meanwhile, patients are guided to receive examination, and triage as soon as possible; while the necessity and objectives of such auxiliary examinations are explained to the patients and their family members, and

assistance is provided to patients to complete the exam. A urine receptacle is prepared for patients in advance, or some warm water and disposable cups if patients are to receive B-ultrasonic examinations. Furthermore, a thorough evaluation is performed for patients' recognition of the disease, family support, educational background, psychology and medical expectations, based on which, the individual pain nursing plans are established. Paramedics actively and positively communicate with patients to build an amicable relationship with them, earning understanding and trust from their family members. Family members are patients' constant companions, comforters and psychological supporters.

Active adoption of pain nursing measures: Highly stressing pains reported by patients have paramedics accurately evaluate the pain intensity based on their understanding of patients, and flexibly adjust the individual pain intervention measures depending on the pain evaluation results to maximally satisfy patients' rational demands. In addition, encouragement and comfort are given to patients through careful explanation to make them feel respected and safe; patients are required to stay in bed, curling up on their side or in the knee-chest position, and to distract their attention with chatting, music, slow-rhythm deep breathing to alleviate pains, while their family members give a massage on the patients' waist and abdomen for relaxation, elimination some of the adverse emotions such as dysphoria and anxiety, and elevation of pain threshold; in case of obvious syndromes, patients may be treated with anti-spasmodic and analgesic drugs according to doctor's oral advice for the purpose of relieving pains. At last, the cause of renal colic, i.e., sudden onset and incarceration of calculus, which can lead to acute obstruction, and the importance of active cooperation with treatments in the effective relief of pains is explained to patients so that they are less nervous and afraid.

Attention on nursing: When providing nursing services, paramedics are skilled and gentle. They explain the drug actions, possible drug-related adverse reactions and take notes during drug use, and actively communicate with patients to direct their attention; venipuncture is performed as gently as possible and successfully attempting to avoid increased pains to patients due to repeated operations.

Appropriate health education: From the moment of reception, paramedics explain about knowledge of nephrolith to patients and their family members in simple words, and observe the patients' expressions carefully so as to understand their psychological status and pain intensity. In addition to giving advice on drinking enough, patients are given the correct self-nursing methods in case of pain, and various treatment methods for nephrolith, including ESLW and drugs, from which the best one is selected; furthermore, successful cases are described to patients in order to increase their confidence in treatment.

Observation indices

(1) Visual analogue scale (VAS): before and after nursing, both groups were assessed for pain intensity by VAS. VAS contains 11 numbers from 0 to 10, of which, 0 indicates no pain, and 10 is the worst possible pain. Patients select a number subjectively to reflect their pain intensity. (2) Negative emotions: before and after nursing, patients were assessed for changes in negative emotions by the self-rating anxiety scale (SAS) and the self-rating depression scale (SDS). With 50 as the minimum value, the SAS results include moderate (50-59), mild (60-69), and severe (>69), while for SDS with a minimum value of 53, the results are categorized as moderate (53-62), mild (63-72) and severe (>73) [9, 10]. (3) Physiological stress indicators: the 2 groups were compared for changes in heart rate, DBP and SBP before and after nursing. (4) Nursing satisfaction: a nursing satisfaction questionnaire developed by the department was used to evaluate patients' nursing satisfaction from aspects such as environment, health education, treatment & nursing, and reception. Based on a full score of 100, the investigation results may be categorized as high satisfaction (>90), basic satisfaction (80-90), and dissatisfaction (<80) [11]. Total satisfaction = high satisfaction + basic satisfaction.

Statistical analysis

Statistical analysis was performed with SPSS 22.0. In case of numerical data expressed as Mean \pm Standard Deviation, comparison studies were carried out through independent-samples T test for data which were normally distributed, and Mann-Whitney U test for data which

were not normally distributed, paired test for pre-and-pro comparison in the group; in case of nominal data expressed as [n (%)], comparison studies were carried out through X^2 test for intergroup comparison. For all statistical comparisons, significance was defined as $P < 0.05$.

Results

Comparison between the observation group and the control group in general materials

The observation group consisted of 33 males (68.75%) and 15 females (31.25%) with an age range between 20-55 and mean age of (35.26 \pm 1.26) years; while the control group included 30 males (63.83%) and 17 females (36.17%) with an age range between 21-56 and mean age of (35.37 \pm 1.29) years. Patients in the observation group reported a time frame from the onset to medical visit of 1-5 h with mean value of (3.15 \pm 0.26) h; while the control group had 1-6 h and (3.19 \pm 0.23) h. In the observation group, 21 (45.83%) patients had calculuses on the left, 16 (33.33%) on the right and 10 (20.83%) on both sides, or 28 (58.33%) had single lesion and 20 had multiple lesions (≥ 2) (41.67%). By comparison, in the control group, 21 (44.68%) patients had calculuses on the left, 17 (36.17%) on the right and 9 (19.15%) on both sides, or 29 (61.70%) had single lesion and 18 had multiple lesions (≥ 2) (38.30%). The 2 groups had no statistical difference in general variables such as gender, age, time elapse from onset to medical visit, onset site (**Figure 1**) and type ($P > 0.05$, **Table 1**).

Comparison between the observation group and the control group in VAS score

Without statistical difference before nursing ($P > 0.05$), the 2 groups demonstrated a reduction in VAS score after nursing ($P < 0.05$), which was more significant in the observation group ($P < 0.05$, **Table 2**).

Comparison between the observations group and the control group in SAS and SDS scores

Without statistical difference before nursing ($P > 0.05$), the 2 groups demonstrated a reduction in SAS and SDS scores after nursing ($P < 0.05$), which was more significant in the observation group ($P < 0.05$, **Table 3**).

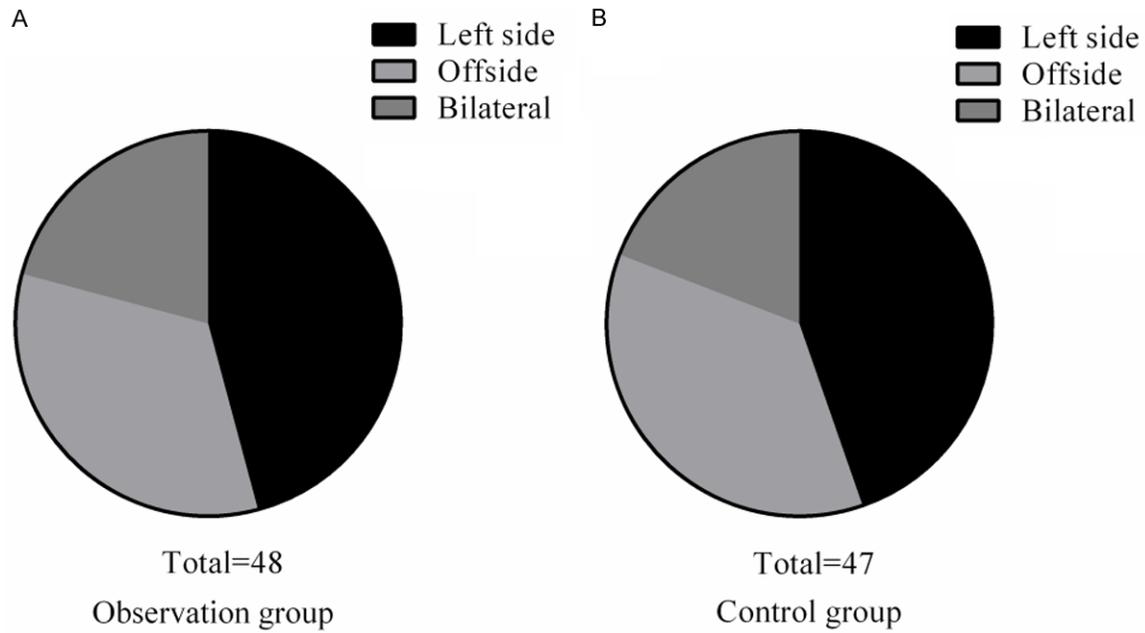


Figure 1. Comparison between the observation group and the control group for the onset site of nephrolith. For calculus positions categorized by the left side, the right side and the bilateral sides, the proportions were 45.83%, 33.33% and 20.83% in the observation group, and 44.68%, 36.17% and 19.15% in the control group ($P>0.05$).

Table 1. Comparison between the observation group and the control group for general materials [n (%)]/($\bar{x} \pm s$)

Materials	Observation Group (n=48)	Control Group (n=47)	t/X ²	P	
Gender (n)	Male	33 (68.75)	30 (63.83)	0.257	0.612
	Female	15 (31.25)	17 (36.17)		
Age (y)	35.26±1.26	35.37±1.29	0.420	0.675	
Time elapse from onset to medical visit (h)	3.15±0.26	3.19±0.23	0.794	0.429	
Onset site					
Left	22 (45.83)	21 (44.68)	0.026	0.963	
Right	16 (33.33)	17 (36.17)			
Both sides	10 (20.83)	9 (19.15)			
Onset type					
Single	28 (58.33)	29 (61.70)	0.112	0.738	
Multiple	20 (41.67)	18 (38.30)			

Table 2. Comparison between the observation group and the control group for VAS score ($\bar{x} \pm s$, score)

Group	Before Nursing	After Nursing
Observation Group (n=48)	7.15±0.26	3.28±0.22 ^{#,*}
Control Group (n=47)	7.19±0.22	1.18±0.08 [#]
t	0.809	61.570
P	0.421	0.000

Note: # represents $P<0.05$ as compared with the conditions before nursing; * represents $P<0.05$ as compared with the control group.

Comparison between the observation group and the control group in physiological stress indicators

Before nursing, the observation group reported a heart rate of (95±9) beats/min, and the control group was (96±8) beats/min ($P>0.05$). After nursing, both groups slowed down to (78±10) beats/min and (89±11) beats/min, respectively ($P<0.05$),

Table 3. Comparison between the observation group and the control group for SAS and SDS scores ($\bar{x} \pm s$, score)

Group	SAS Score		SDS Score	
	Before Nursing	After Nursing	Before Nursing	After Nursing
Observation Group (n=58)	61.32±2.29	32.15±1.05 ^{#,*}	60.62±2.85	32.15±1.09 ^{#,*}
Control Group (n=57)	61.28±2.36	43.26±1.28 [#]	60.58±2.96	45.26±1.26 [#]
t	0.084	46.199	0.067	54.188
P	0.933	0.000	0.947	0.000

Note: # represents P<0.05 as compared with the conditions before nursing; * represents P<0.05 as compared with the control group.

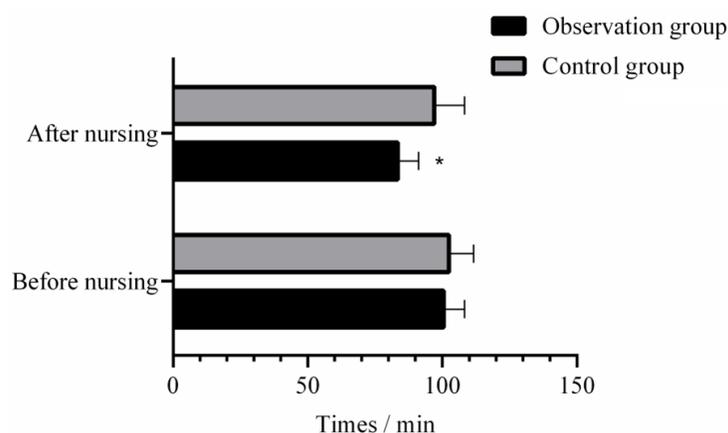


Figure 2. Comparison between the observation group and the control group for heart rate before and after nursing. Before nursing, the 2 groups had no statistical difference in heart rate (P>0.05) and after nursing, the observation group was lower than the control group (P<0.05). * indicates P<0.05 as compared with the control group.

and the observation group was slower than the control group (P<0.05, **Figure 2**).

Before nursing, the observation group reported a SBP of (149±8) mmHg, and the control group was (148±7) mmHg (P>0.05). After nursing, both groups demonstrated a reduction (P<0.05) to (122±9) mmHg and (139±10) mmHg, respectively (P<0.05, **Figure 3**).

Before nursing, the observation group reported a DBP of (106±10) mmHg, and the control group was (108±9) mmHg (P>0.05). After nursing, both groups demonstrated a reduction (P<0.05) to (82±2) mmHg and (99±10) mmHg, respectively (P<0.05, **Figure 4**).

Comparison between the observation group and the control group in nursing satisfaction

In the observation group, 38 patients were highly satisfied, 8 basically satisfied and 2 dissatisfied, resulting in a nursing satisfaction of

95.83%, while in the control group, the corresponding data were 27, 8, 12 and 74.47%, respectively (P<0.05, **Table 4**).

Discussion

Nephrolith is an ordinary ED disease that its sufferers may have symptoms such as fear of cold, fever and severe colic in the case of acute onset, which will severely affect their quality of life and physical health [12, 13]. Clinically acute nephrolith is characterized by severe pain leading to accelerated heart rate and elevated blood pressure, and affecting the normal physiologic equilibrium or even resulting in shock in severe

cases [14]. Next, pain is also a cause of neuro-regulatory disorder such that the patients may have negative emotions such as anxiety and intensity [15].

As the pain evaluator and implementer of painkilling measures, paramedics can evaluate pains in a regulated manner to improve pain control satisfaction by targeted pain intervention plans [16]. Sometimes an acute onset of severe pain can't be relieved by drug administration satisfactorily [17]. Affected by severe pains, patients may lose control and initiate medical disputes. To maximally reduce the pains patients suffer and reduce the incidence of medical disputes, timely adoption of scientific measures to stop pains is the first challenge in clinical treatment of acute nephrolith [18, 19]. A study revealed that active and effective nursing measures during treatment of patients with acute nephrolith is advantageous to the alleviation of pain intensity, patients' negative emotions and stress reactions [20].

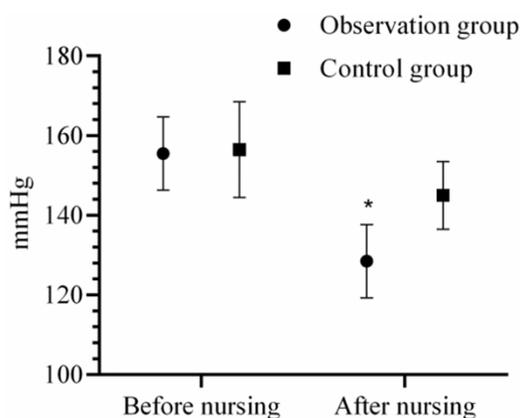


Figure 3. Comparison between the observation group and the control group for SBP before and after nursing. Before nursing, the 2 groups had no statistical difference in SBP ($P>0.05$) and after nursing, the observation group was lower than the control group ($P<0.05$). * indicates $P<0.05$ as compared with the control group.

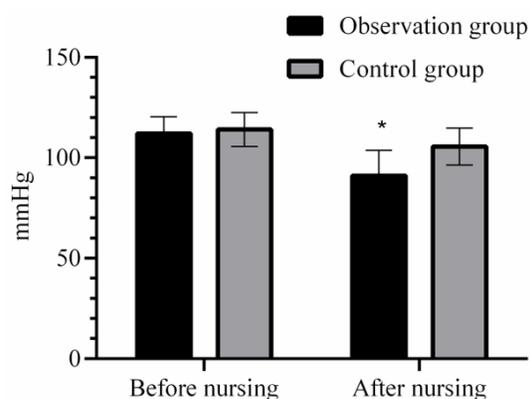


Figure 4. Comparison between the observation group and the control group for DBP before and after nursing. Before nursing, the 2 groups had no statistical difference in DBP ($P>0.05$) and after nursing, the observation group was lower than the control group ($P<0.05$). * indicates $P<0.05$ as compared with the control group.

In the present study, the observation group reported a lower VAS score after nursing as compared with the control group ($P<0.05$), indicating that individual pain nursing intervention can alleviate pain intensity in patients with acute nephrolith, paramedics have fully respected patients' individual differences by formulating individual pain management plans based on their understanding of each patient's conditions, psychological status and family support [21]. Secondly, in this model, paramedics not only intervened with patients by pain medication, but also enhanced psychological counsel-

ing according to patients' psychological status, leading to an apparent reduction in negative emotions. Results of the study indicated that, compared with the control group, the observation group had lower SAS and SDS scores, reduced heart rate and SBP and DBP after nursing ($P<0.05$) though the patients in the observation group claimed accelerated heart rate and elevated blood pressure before nursing due to more severe pain, indicating that individual pain nursing intervention is good for improving state of physiological stress [22]. The reasons lie in the individual pain nursing model which requires family members giving a massage to patients' abdomen for the purpose of physical and mental relaxation, and elevated pain threshold; paramedics are required to perform all nursing operations skillfully and gently to prevent any discomfort due to improper operation and reduce the incidence of medical disputes [23]. In addition, properly enhanced health education is beneficial to the improved patients' recognition of the disease, remissive mental pressure, and ameliorated physiological stress levels [24]. The present study also revealed that, 95.83% of the patients in the observation group were satisfied with the nursing, higher than the control group's 74.47% ($P<0.05$), further evidence for the effectiveness and effects of individual pain nursing in enhancing the nursing satisfaction of patients with acute nephrolith. In the process of nursing, paramedics actively and positively communicate with patients and their family members who were instructed to support and encourage the patients psychologically and make them feel respected and cared for. In such a process, an amicable relationship was established with patients, and their nursing satisfaction raised consequently [25]. Zhu et al [26] also performed individual nursing intervention on patients with acute nephrolith, and obtained results similar to our study, including clear reduction of pain intensity and elevation of satisfaction, further supporting the scientific and effectiveness of individual pain nursing.

In conclusion, individual pain nursing intervention is a model to be popularized as it can reduce the pain intensity and stress reactions of patients with acute nephrolith, improve their negative emotions and nursing satisfaction.

However, this study included less study subjects so that its results may be less representa-

Table 4. Comparison between the observation group and the control group for nursing satisfaction [n (%)]

Group	n	High Satisfaction	Basic Satisfaction	Dissatisfaction	Total Satisfaction
Observation Group	48	38 (79.17)	8 (16.67)	2 (4.17)	46 (95.83)*
Control Group	47	27 (57.44)	8 (17.02)	12 (25.53)	35 (74.47)
χ^2					8.627
<i>P</i>					0.003

Note: * represents $P < 0.05$ as compared with the conditions before nursing.

tive. Further studies shall be more in-depth based on a larger sample size.

Disclosure of conflict of interest

None.

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