

Original Article

Effects of comprehensive nursing on joint function and psychological rehabilitation of elderly type II diabetes mellitus patients with femoral neck fracture undergoing total hip arthroplasty

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Abstract: Objective: To explore the effects of comprehensive nursing on joint function and psychological rehabilitation of elderly type II diabetes mellitus (also known as non-insulin dependent diabetes mellitus (NIDDM)) patients complicated with femoral neck fracture (FNF) undergoing total hip arthroplasty (THA). Methods: A total of 140 elderly NIDDM patients with FNF undergoing THA were selected and randomly divided into two groups according to random number table, the control group and the study group, with 70 cases in each group. Patients in the control group were given conventional nursing, while those in the study group were given comprehensive nursing. The specific conditions of all patients were observed and recorded. Results: After 15 days of nursing, the pain scores of patients in the study group were significantly lower than those in the control group ($P < 0.05$). The pain scores of patients gradually decreased after 30 days and 45 days of nursing (both $P < 0.05$). The questionnaire of quality of life (QOL) score (appetite, spirit, sleep, lassitude and pain) in the study group was significantly higher than that in the control group after nursing ($P < 0.05$). The self-rating depressing scale (SDS) score and self-rating anxiety scale (SAS) score in the study group were significantly lower than those in the control group (both $P < 0.05$). According to the Harris score, the excellent and good rate of hip joint function in the study group was significantly higher than that in the control group ($P < 0.05$). The range of motion (ROM) of hip joint (flexion, abduction, adduction, external and internal rotation) in the study group was significantly higher than that in the control group (all $P < 0.05$). The incidence of lower limb deep vein thrombosis, pressure sore and pulmonary infection in the control group was significantly higher than that in the study group (all $P < 0.05$). Conclusion: For elderly patients with NIDDM and FNF undergoing THA, comprehensive nursing reduces the occurrence of common risks and helps to improve the hip joint function.

Keywords: Comprehensive nursing, total hip arthroplasty, elderly type II diabetes mellitus, femoral neck fracture, joint function, psychological rehabilitation

Introduction

The high concentration of blood sugar level of diabetes mellitus patients leads to osmotic diuresis and promotes the discharge of phosphorus and calcium, thus causing the possibility of osteoporosis [1]. Elderly type II diabetes mellitus, also known as non-insulin dependent diabetes mellitus (NIDDM), has become one of the diseases that threaten people's physical and mental health [2]. With increasing incidence of NIDDM, the incidence of femoral neck fracture (FNF) is also increasing, and the treatment tolerance of elderly patients is greatly

reduced, which also brings many difficulties to later nursing [3]. At present, traditional femoral and tibial fracture surgeries have been gradually replaced by total hip arthroplasty (THA) with the continuous improvement of medical technology. THA is a surgical method that can relieve the pain, promote the recovery and improve the hip joint function of patients [4].

At present, comprehensive nursing is implemented for patients in the Second Affiliated Hospital of Xi'an Jiaotong University. Comprehensive evaluation, medication and diet management for patients are conducted before sur-

gery [5]. The patient's psychology and physiology would be affected to varying degrees after surgery, while the traditional nursing does not involve the psychological comfort and complication prevention, which worsens the patient's condition. Comprehensive nursing, which is gradually applied in hospitals, can improve the psychological state, prevent the occurrence of complications and greatly promote the recovery of patients. In this research, we want to explore the effect of comprehensive nursing on their joint function and psychological rehabilitation.

Materials and methods

General information

A total of 140 patients with elderly NIDDM and FNF who underwent THA and treated in the Second Affiliated Hospital of Xi'an Jiaotong University from October 2016 to October 2017 were selected and randomly divided into two groups according to random number table, namely the control group and the study group, with 70 cases in each group. In the control group, there were 36 males and 34 females, aged 62-70 years, with an average age of 62.9 ± 7.8 years. There were 35 males and 35 females in the study group, aged 63-72 years, with an average age of 64.1 ± 7.9 years. The study was approved by Ethics Committee of the Second Affiliated Hospital of Xi'an Jiaotong University. All patients and their families signed informed consents.

Inclusion criteria: Patients who voluntarily participated in this study and agreed to follow up; patients who were stable and conscious after the surgery and cooperated with the treatment; patients ≥ 60 years old; patients with normal psychology and no experience of mental illness in family history. **Exclusion criteria:** Patients allergic to angiotensin receptor blockers (ARBs) and angiotensin converting enzyme inhibitors (ACEIs) and unable to bear adverse reactions (rash, cough, pregnancy, hypotension, hyperkalemia) caused by ARBs; patients with poor comprehension.

Methods

Skin traction was carried out on the affected limb of the patient. Before the surgery, a comprehensive examination was performed to de-

termine the treatment plan. THA was carried out after the glucose homeostasis was achieved [6].

Methods in control group

Patients in the control group were given conventional nursing. Keeping the ward areas quiet within the 5 days after hospitalization, if patients suffered from loss of consciousness, the duration needed to be appropriately extended [7]. For patients with loss of consciousness, nursing staff observed their vital signs regularly on a daily basis. Patients with normal consciousness were told about the pre- and post-surgical attentions [8]. The nursing staff inquired the patient's recent eating habits to find problems according to the actual situation, and summarized and recorded the problems [9]. The attending physicians were informed about the recorded problems, and then formulated an appropriate treatment plan.

Methods in study group

Comprehensive nursing was adopted in the study group. Before treatment, the patients were given conventional nursing. In addition, psychological construction was strengthened, and the relevant knowledge of the disease was told to patients. The nursing staff encouraged and supported the patients with high sympathy and sense of responsibility to prevent them from being too nervous, and to assure index balance before the surgery, thus improving their compliance [10]. To prevent the complications that are easy to occur after the surgery, the nursing staff learned the related common complications. When abnormal phenomena appeared, the attending physicians were informed immediately. Fasting and 2 hours postprandial blood glucose levels were monitored respectively [11]. Patients' daily diet was reasonably planned, which included prohibition of alcohol and tobacco, avoidance of overeating, promotion of light diet and high-protein foods, control of calories and fat intake [12]. Proper physical exercise and progressive training were carried out for rapid recovery of patients after surgery. For the pain tolerance after treatment, relaxation therapy could be applied to relax the patient's body so as to achieve the purpose of alleviating body pain. Meanwhile, appropriate amount of drug therapy can also be applied.

Table 1. Comparison of general data ($\bar{x} \pm sd$)

Group	Control group (n = 70)	Study group (n = 70)	χ^2/t	P
SBP (mmHg)	117.38 ± 11.82	119.25 ± 11.60	0.945	0.346
DBP (mmHg)	75.36 ± 6.75	75.12 ± 6.88	0.028	0.866
Gender			0.591	0.077
Male	36	35		
Female	34	35		
Age (years)	62.90 ± 7.80	64.10 ± 7.90	0.904	0.367
BMI (kg/m ²)	24.21 ± 3.56	23.84 ± 3.68	0.605	0.546
Course of disease (months)	6.94 ± 4.15	6.81 ± 4.24	0.183	0.855
Blood sugar (mmol/L)	14.82 ± 2.65	14.62 ± 2.91	0.430	0.668

Note: SBP, systolic blood pressure; DBP, diastolic blood pressure; BMI, body mass index.

Table 2. Comparison of pain scores ($\bar{x} \pm sd$)

Group	Control group (n = 70)	Study group (n = 70)	t	P
Before nursing	7.13 ± 1.51	7.42 ± 1.59	1.107	0.270
15 days after nursing	2.72 ± 2.08	1.35 ± 1.17	4.803	< 0.001
30 days after nursing	2.35 ± 1.87	1.33 ± 0.81	4.188	< 0.001
45 days after nursing	1.72 ± 1.41	1.09 ± 0.78	3.271	0.001

Corresponding methods were adopted according to the actual situation of the patient.

Outcome measures

The pain scores (before and 15, 30, 45 days after nursing); questionnaire of quality of life (QQL) scores (appetite, spirit, sleep, lassitude and pain) before and after nursing; self-rating depressing scale (SDS) score and self-rating anxiety scale (SAS) score before and after nursing; excellent and rate of hip joint function of Harris score after nursing; range of motion (ROM) (hip joint flexion, abduction, adduction, external rotation and internal rotation) and incidence of common risks (lower limb deep vein thrombosis, pressure sore and pulmonary infection) in nursing were observed and recorded.

Harris hip joint function scale was used to evaluate the joint function of patients, with a full score of 100 points, excellent: over 90 points; good: 70-89; poor: below 70 [13].

QQL score: A questionnaire edited by Zhou Jichang and Sun Yan was used to evaluate the quality of life of the patients, including appetite, spirit, sleep, lassitude and pain [14].

SDS score was classified into 4 grades, mild depression: 53-62 points; moderate depression: 63-72; severe depression: above 72. SAS score: mild anxiety: 50-59 points; moderate anxiety: 60-69; severe anxiety: above 70 [15].

Statistical methods

SPSS20.0 software was used for data analysis, and the measurement data were expressed as mean ± standard deviation ($\bar{x} \pm sd$). Independent sample t test or Welch's correction was used for comparison between groups, repeated measures analysis of variance for intra-group comparison and paired samples t test for pre- and post-nursing comparison

of each group. A value of $P < 0.05$ indicated statistically significant differences.

Results

Comparison of general data

There was no significant difference in gender, age, body mass index (BMI), average course of disease, blood sugar, systolic blood pressure (SBP) and diastolic blood pressure (DBP) levels between the two groups (all $P > 0.05$), as shown in **Table 1**.

Comparison of pain scores

After 15 days of nursing, the pain scores of patients in the study group were significantly lower than those in the control group ($P < 0.05$). The pain scores of patients gradually decreased after 30 days and 45 days of nursing ($P < 0.05$), as shown in **Table 2**.

Comparison of QQL score

After nursing, the QQL score (appetite, spirit, sleep, lassitude and pain) in the study group was significantly higher than that in the control group (all $P < 0.05$), as shown in **Table 3**.

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Table 3. Comparison of QQL score ($\bar{x} \pm sd$)

Group	Study group (n = 70)		Control group (n = 70)	
	Before nursing	After nursing	Before nursing	After nursing
Appetite	5.61 ± 1.64	8.04 ± 1.21 ^{a,b}	5.88 ± 1.54	6.70 ± 1.96 ^b
Spirit	4.73 ± 1.33	6.89 ± 2.44 ^{a,b}	4.71 ± 1.47	5.74 ± 2.18 ^b
Sleep	5.47 ± 1.12	6.96 ± 2.12 ^{a,b}	5.12 ± 0.95	6.11 ± 1.85 ^b
Lassitude	5.06 ± 0.83	8.13 ± 1.48 ^{a,b}	4.83 ± 0.82	6.79 ± 1.62 ^b
Pain	3.82 ± 1.65	6.72 ± 1.49 ^{a,b}	3.71 ± 1.52	5.14 ± 1.83 ^b

Note: QQL, questionnaire of quality of life. Comparison between the groups, ^aP < 0.05; Comparison within the group, ^bP < 0.05.

Table 4. Comparison of SDS score and SAS score ($\bar{x} \pm sd$)

Group	Control group (n = 70)	Study group (n = 70)	t	P
SDS				
Before nursing	52.83 ± 3.61	52.55 ± 3.73	0.451	0.652
After nursing	35.58 ± 3.42 ^{***}	23.48 ± 3.31 ^{***}	21.367	< 0.001
SAS				
Before nursing	56.03 ± 3.69	56.47 ± 4.17	0.661	0.510
After nursing	35.87 ± 3.44 ^{***}	22.82 ± 3.76 ^{***}	21.645	< 0.001

Note: SDS, self-rating depressing scale; SAS, self-rating anxiety scale. Compared with before nursing in the same group, ^{***}P < 0.001.

Table 5. Comparison of excellent and good rate of hip joint function with Harris score (n, %)

Group	Excellent	Good	Poor	Excellent and good rate
Control group (n = 70)	15 (21.43)	30 (42.85)	25 (35.7)	64.28%
Study group (n = 70)	25 (35.71)	32 (45.71)	13 (18.57)	81.43%
χ^2				5.201
P				0.023

Table 6. Comparison of ROM of hip joint ($\bar{x} \pm sd$)

Group	Control group (n = 70)	Study group (n = 70)	t	P
Flexion	90.75 ± 16.27	120.91 ± 10.77	13.014	< 0.001
Abduction	15.54 ± 13.08	35.54 ± 4.25	12.248	< 0.001
Adduction	17.09 ± 9.73	30.31 ± 3.76	10.718	< 0.001
External rotation	21.08 ± 9.59	40.72 ± 2.14	16.687	< 0.001
Internal rotation	18.33 ± 1.98	30.21 ± 3.78	23.290	< 0.001

Note: ROM, range of motion.

Comparison of SDS score and SAS score

The SDS score and SAS score in the study group were significantly lower than those in the control group after nursing (P < 0.05), as shown in **Table 4**.

Comparison of excellent and good rate of hip joint function with Harris score

According to the Harris score, the excellent and good rate of hip joint function in the study group was significantly higher than that in the control group after nursing (P < 0.05), and the specific data are shown in **Table 5**.

Comparison of ROM of hip joint

The ROM of hip joint (flexion, abduction, adduction, external and internal rotation) in the study group was significantly higher than that in the control group (P < 0.05), as shown in **Table 6**.

Comparison of incidence of common risks

The incidence of lower limb deep vein thrombosis, pressure sore and pulmonary infection in the control group was significantly higher than that in the study group ($\chi^2 = 10.21$, P = 0.001), as shown in **Figure 1**.

Discussion

Diabetes mellitus is a metabolic disorder that causes physiological changes and pathological reactions [16]. Once complicated with FNF, it will seriously affect the success rate of the surgery and the recovery of the fracture, and even aggravate its own severity and increase the incidence of adverse reactions [17].

During the perioperative period, fracture and diabetes mellitus easily interact with each other, thus forming a vicious circle. Moreover, the physiological and psychological changes after surgery will lead to the aggravation of the patient's condition, causing the occurrence of

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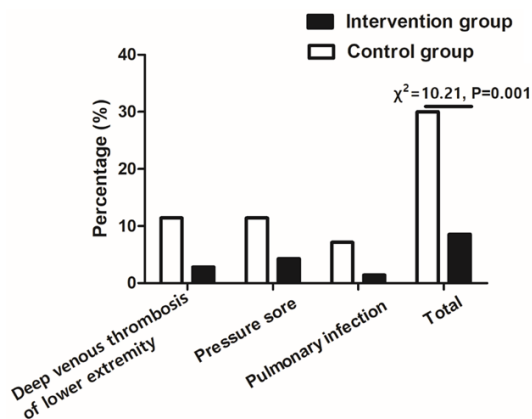


Figure 1. Comparison of incidence of common risks.

complications [18]. The comprehensive nursing mainly includes prevention of postoperative complications, education of patients' disease knowledge, blood sugar control, life guidance, preparation before surgery and rehabilitation guidance [19]. After nursing, the SDS score of patients with conventional nursing was 35.58 ± 3.42 , while that of patients with comprehensive nursing was 23.48 ± 3.31 , indicating that comprehensive nursing reduces the psychological stress response, improves the psychological state, and facilitates the recovery of patients with NIDDM and FNF undergoing THA [20]. In clinical practice, comprehensive nursing provides psychological counseling and knowledge of related diseases, which is helpful to improve patients' compliance, thus promoting their physical recovery and reducing the occurrence of adverse reactions [21]. According to the above data, the SDS score and SAS score in the study group were significantly lower than those in the control group after nursing. The excellent and good rate of hip joint function of Harris score in the study group was significantly higher than that in the control group. The ROM of hip joint (flexion, abduction, adduction, external and internal rotation) in the study group was significantly higher than that in the control group. The incidence of lower limb deep vein thrombosis, pressure sore and pulmonary infection in the control group was significantly higher than that in the study group.

The pain of the patients was obviously relieved because comprehensive nursing increased pre-, intra and post- surgical nursing [22]. In this study, the pain scores of the patients in

the study group were significantly lower than those in the control group, and the scores gradually decreased after 30 days and 45 days of nursing. The QOL scores (appetite, spirit, sleep, lassitude and pain) in the study group were significantly higher than those in the control group. Prevention of common adverse reactions, dynamic monitoring of vital signs, and monitoring of ketone body level of patients were carried out to understand postoperative recovery of patients. If blood pressure drop, drowsiness, deep and fast breath, dullness and little urine appear, the doctor should be informed immediately for treatment. Nurses encouraged patients to drink more water and closely observed the amount and color of patients' urine. The urine bag was placed below the bladder, and perineal care was performed twice a day. Catheter was clamped to perform individualized releasing of urine. The catheter was pulled out 3 days after surgery. Corresponding preventive measures were taken to prevent the occurrence of adverse reactions and greatly improve the quality of life of patients.

When nursing intervention is carried out on patients, it is necessary to emphasize the regulation of blood sugar level and to observe the occurrence of diabetes mellitus and other complications during the perioperative period. Some psychological care should also be given to the patients so as to greatly improve their compliance. Early functional training for patients can improve their self-care ability and quality of life. However, there are still some problems to be solved in this study, such as the small sample size and insufficient research. Therefore, our hospital will continue to carry out detailed analysis with large samples and to further explore the effect of comprehensive nursing on joint function and psychological rehabilitation of elderly NIDDM patients complicated with FNF undergoing THA.

In summary, for elderly patients with NIDDM and FNF undergoing THA, comprehensive nursing reduces the occurrence of common risks and helps to improve the hip joint function, which is worthy of further promotion and application.

Disclosure of conflict of interest

None.

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