

## **Effect Of Predictive Nursing Intervention On Preventing Deep Venous Thrombosis Of The Lower Extremity After Hip Arthroplasty**

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### **Abstract**

**Objective:** To explore the preventive effect of predictive nursing on deep vein thrombosis (DVT) in lower limbs after total hip replacement.

**Methods:** A total of 64 patients who underwent total hip replacement in our hospital from May 2022 to May 2023 were selected for this study. Patients were randomly divided into observation groups and control groups according to different nursing interventions. The control group received routine nursing intervention, and the observation group was given predictive nursing intervention based on routine nursing. The blood flow velocity, harris score, DVT of lower limbs, length of hospital stay, and adverse reaction were observed in the two groups.

**Results:** Before nursing intervention, there were no significant differences in blood flow velocity and harris score between the 2 groups ( $P > 0.05$ ). After predictive nursing intervention, the blood flow velocity and harris score in the observation group were better than those in the control group ( $P < 0.05$ ). There was no significant difference in the incidence rate of aches, swell, and infection in lower limbs between the control group and the observation group ( $P > 0.05$ ), whereas the incidence rate of DVT in the observation group was significantly lower than that in the control group ( $P < 0.05$ ). In addition, the average length of hospital stay and incidence of total adverse reactions in the observation group was lower than that in the control group, with a significant statistical difference ( $P < 0.05$ ).

**Conclusion:** Predictive nursing intervention has an ideal effect on the prevention of DVT in lower limbs after total hip replacement, and this clinical popularization has a broad prospect.

**Keywords:** Predictive nursing; total hip replacement; DVT; blood flow velocity.

### **Introduction**

Hip arthroplasty is an important operation for the treatment of femoral neck fracture and femoral head necrosis, etc [1]. Compared with internal fixation surgery and conservative treatment, hip replacement can correct the deformity, effectively improve hip joint function, reduce the time of bed rest, and recover faster after surgery [2]. In addition, it can avoid complications such as non-union or difficult healing of fracture and ischemia in the femoral head [3]. With the continuous maturity of total hip replacement

technology, the number of patients undergoing hip replacement surgery is increasing year by year [4].

Deep vein thrombosis (DVT) is a main complication of hip arthroplasty, with an incidence rate of up to 70%, which may lead to venous obstruction, and even result in pulmonary embolism, threatening the life of patients [5, 6]. DVT occurs mostly in the braking state and is more common in the lower limbs [7]. The vein endothelium injury and blood flow slow caused by post-operative manipulation and hypercoagulability of blood are the possible causes of DVT in lower limbs [8]. In terms of preventing DVT, circulatory pressure treatment, health education, drugs, and other pre-prevention methods in foreign are mainly used, while in China, the pre-prevention methods mainly include psychological nursing, high-quality nursing, path nursing, and other aspects [9, 10]. At present, the nursing effect in our country is not well. It is still necessary to find the best nursing mode to achieve the balance of human, physical, and financial resources.

In this paper, we collected 32 patients who were determined to receive total hip arthroplasty in our hospital and analyzed the effect of predictive nursing on DVT of lower limbs after hip arthroplasty.

## **Patients and methods**

### **General information**

A total of 64 patients who received a total hip replacement in our hospital from May 2022 to May 2023 were selected for this study. Patients were randomly divided into observation groups and control groups based on different nursing interventions. The observation group included 32 cases, 21 males and 11 females; the age range of the patients was 46 to 78 years old, with a mean age of  $(61.50 \pm 2.61)$  years; there were 19 cases of femoral neck fracture, 10 cases of femoral head necrosis and 3 cases of hip dysplasia. The control group included 32 cases, 20 males and 12 females; the age range of the patients was 45 to 78 years old, with a mean age of  $(60.65 \pm 2.43)$  years; there were 18 cases of femoral neck fracture, 11 cases of femoral head necrosis and 3 cases of hip dysplasia. This study was approved by the Ethics Committee of the Chongqing Three Gorges University, and the patients or family members had signed the informed consent documents. There was no significant difference in age, sex, basic diseases, and other basic clinical data between the two groups ( $P > 0.05$ ).

### **Inclusion criteria**

(1) Patients enrolled in this study had no previous history of deep vein embolism or phlebitis. (2) No anticoagulant drugs were used 2 weeks before surgery. (3) Patients had no history of allergy to anesthesia drugs, and no major organ dysfunction or other underlying diseases that could tolerate surgery. (4) Normal coagulation function. (5) Consent to surgery and follow-up treatment.

### **Methods**

**Control group:** The control group was treated with routine nursing interventions, including health education, life guidance, and functional training, etc.

**Observation group:** Predictive nursing interventions were performed on the basis of the control group. (1) Preoperative assessment and health guidance: The risk of lower extremity deep vein thrombosis was evaluated before the operation. Patients and their family members were given corresponding guidance

to dissolve the tension according to specific situations. (2) Postoperative observation: After surgery, the swelling degree, sensory sensation, skin temperature, color, and static pulse filling of the patient's lower extremities were observed. Patients' damaged limbs should be elevated to ensure smooth drainage. (3) Drug therapy: Low molecular weight heparin was injected subcutaneously 12 h after the operation to prevent thrombosis. (4) Vascular protection: Avoid repeated punctures on the same side of the lower limb during venipuncture, ensure the one-time success rate of venipuncture, and reduce the skin damage in the blood tube of patients. (5) Dietary guidance and early functional training: patients should be given a light diet with high protein, high vitamin, high calorie, low salt and low fat. The first day after surgery is the high incidence period of lower extremity deep vein thrombosis, and early training of quadriceps and gluteus maximus in patients is helpful to prevent lower extremity deep vein thrombosis.

**Examination and diagnosis:** Combined with the patient's clinical manifestations such as lower limb swelling, pain, and shallow vein dilation, using ultrasound Doppler examination and antegrade lower limb vein angiography are helpful to make a clear diagnosis and understand the scope of lesions.

**Observation indicators:** (1) The swelling, ache and infection of lower limbs were observed in the two groups during hospitalization. The swelling was measured, and the measurement site was about 10 cm at the lower edge of the patella. Ultrasound Doppler examination was used for diagnosis if the above DVT symptoms were found. (2) The venous blood flow velocity of the lower limbs of the two groups was recorded, detected by color Doppler ultrasound, and evaluated by Harris score, which included gait, functional activity, walking distance, etc., with a total of 100 points. The higher score represents the better the recovery of hip joint. (3) The length of hospital stay was recorded.

**Statistical analysis:** Correlation data were analyzed using SPSS18.0 statistical software. The measurement data were expressed by  $\bar{x}\pm s$ , the differences between groups were compared by t-test, and the statistical data were analyzed by  $\chi^2$  test.  $P < 0.05$  was considered statistically significant.

## Results

### Comparison of the blood flow velocity and harris score.

The predictive nursing was implemented immediately after surgery of total hip arthroplasty. After nursing for 24 h, the blood flow velocity and harris score of lower limbs in the observation group were increased, with statistical significance ( $P < 0.05$ ), while there was no statistical difference in blood flow velocity and harris score of lower limbs in the control group ( $P > 0.05$ ). The blood flow velocity and harris score of lower limbs in the observation group were higher than those of the control group ( $P < 0.05$ ). See the details in Table 1.

**Table 1. Comparison of the blood flow velocity and harris score (n=32,  $\bar{x}\pm s$ )**

Group	blood flow velocity		harris score	
	before nursing	24 h after nursing	before nursing	24 h after nursing
Observation	20.70±3.43	32.35±3.30*	47.35±4.35	51.46±5.02*
Control	20.58±3.60	21.63±3.52	47.20±4.73	48.15±4.96
t	0.78	4.10	0.48	2.16
P	0.65	0.03	0.76	0.03

**Note:** \*  $P < 0.05$ , compared to before nursing.

### Comparison of DVT in lower limbs of the two groups.

The incidence rates of aches, swell, and infection in the lower limbs of the control group and observation group showed no significant difference ( $P > 0.05$ ). In the observation group, only 2 patients developed into DVT, with an incidence rate of 6.25%. In the control group, 8 patients developed into DVT, and the incidence rate was 25%. The incidence rate of DVT in the observation group was significantly lower than that in the control group ( $\chi^2 = 3.20$ ,  $P < 0.05$ ). See the details in Table 2.

**Table 2. Comparison of DVT in lower limbs of the two groups (n=32, case (%))**

Group	ache	swell	infection	DVT
Observation	1 (3.13)	1 (3.13)	1 (3.13)	2 (6.25)
Control	5 (15.6)	4 (12.5)	3 (9.34)	8 (25.0)
$\chi^2$	2.83	1.86	0.35	3.20
P	0.09	0.26	0.58	0.04

### Comparison of the hospital stay between the two groups.

The average length of hospital stay in the observation group was  $(10.25 \pm 1.36)$  d, which was lower than that in the control group  $(13.56 \pm 1.76)$  d, and the difference was statistically significant ( $t = 5.62$ ,  $P < 0.05$ ).

### Comparison of adverse reaction.

The incidence of total adverse reactions in the two groups was compared, and the results showed that the incidence rate in the observation group was 9.38%, which was lower than that in the control group (31.25%), and the difference was statistically significant ( $P < 0.05$ ). See Table 3.

**Table 3. Comparison of adverse reaction in the two groups (n (%))**

Group	precordial ache	nausea vomiting	and dizziness headache	and total occurrence
Observation	1 (3.13)	1 (3.13)	1 (3.13)	3 (9.38)
Control	3 (9.38)	3 (9.38)	4 (12.5)	10 (31.25)
$\chi^2$	-	-	-	11.82
P	-	-	-	0.004

## Discussion

DVT of lower limbs is associated with many factors. Among them, surgical trauma, postoperative immobilization, prosthesis implantation, and venipentesis may cause damage to the vascular endothelium and coagulation system, increase the possibility of thrombosis, and even cause lung blockage, threatening the life and health of patients [11-13]. Therefore, the implementation of predictive nursing intervention has positive significance for the early prevention of DVT in lower limbs.

Patients with hip replacement are suffer from large surgical trauma, forced position, and disturbed internal balance after the operation, which is easy to cause hemodynamic changes, resulting in slow blood flow and leading to DVT in lower limbs [7, 14]. In this study, we found that the predictive nursing

intervention significantly increased the blood flow velocity and harris score in lower limbs after surgery for 24 h, as compared to the routine nursing group. The predictive nursing intervention had no significant effect on the incidence rates of aches, swell, and infections in lower limbs, while markedly reducing the predictive nursing intervention when compared to the routine nursing intervention. These results indicate that predictive nursing can effectively prevent the occurrence of DVT and reduce risk. Predictive nursing is a scientific overall nursing model, which proposes targeted preventive measures mainly through a comprehensive assessment of patient's condition and physical quality [15, 16]. In addition, this study observed the hospital stay and adverse reactions after surgery for 24 h. The data revealed that the average length of hospital stay and the incidence rate of total adverse reactions in the predictive nursing intervention group was significantly lower than that in the routine nursing group. Femoral neck fracture occurs more in the elderly who are in a descending state of physical function and is more prone to anemia and intraoperative massive blood loss [17, 18]. Thus, predictive nursing can transform post-remedial into pre-prevention, effectively control the risk factors of DVT, and benefit postoperative rehabilitation.

In conclusion, the predictive nursing intervention has a good preventive effect on DVT of lower limbs in patients undergoing total hip replacement surgery, which is conducive to postoperative rehabilitation and care of patients. The predictive nursing intervention could improve the quality of life of patients and has positive clinical application effects.

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