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Application of intravenous indwelling needles versus peripherally inserted central catheters in the maintenance treatment of acute leukemia

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Highlights

- Although the cost of peripherally inserted central catheters (PICC) is relatively high, it significantly extends the duration of maintenance treatment and therapeutic outcomes of acute leukemia patients.
- PICC placement can effectively relieve patients' anxiety, enhance treatment compliance, and increased overall satisfaction.
- Compared with peripheral indwelling needles, PICC reduces the incidence of venous - related complications, which is conducive to patients' recovery.

Abstract

Objective: To evaluate the therapeutic effects of intravenous infusion using intravenous indwelling needles (IIN) versus peripherally inserted central catheters (PICC) in patients with acute leukemia during maintenance treatment. **Methods:** Eighty-six patients with acute leukemia admitted to the First Affiliated Hospital of Baotou Medical College from July 2022 to March 2023 were randomly divided into the IIN group and the PICC group, with 43 patients in each group. **Results:** Significant differences were observed between the two groups in terms of the number of punctures and puncture time ($P < 0.05$). Although the intubation cost was lower in the IIN group than in the PICC group, the maintenance treatment duration was shorter in the IIN group ($P < 0.05$). There were no significant differences between the two groups in terms of disease symptoms, treatment-related toxicity, and side effects ($P > 0.05$). However, anxiety, treatment compliance, and patient satisfaction were significantly lower in IIN group compared to the PICC group ($P < 0.05$). Additionally, the incidence of vein-related complications in the IIN group was higher than in the PICC group ($P < 0.05$). **Conclusion:** Compared with intravenous indwelling needles, PICCs demonstrate superior application outcomes. Although the cost of PICC placement is relatively high, its ability to prolong maintenance treatment, alleviate patient anxiety, reduce vein-related complications, and improve treatment compliance makes it a valuable method worth promoting.

Keywords: Acute leukemia, nursing staff, intravenous indwelling needles, peripherally inserted central venous catheter, maintenance of treatment time

Introduction

Acute leukemia (AL) is a malignant tumor characterized by abnormal hematopoietic cell

proliferation and is classified into acute lymphocytic leukemia (ALL) and acute myeloid leukemia based on the types of malignant cells [1, 2]. The disease has a poor prognosis

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and high mortality rate, significantly impairing normal hematopoietic function, thereby posing a great threat to patients' health and safety. Chemotherapy, a primary treatment option, can delay disease progression and extend survival time. However, most chemotherapy drugs require intravenous administration [3]. Due to the unique properties of chemotherapy drugs and long-term treatment duration, factors such as safety, convenience, and cost must be carefully considered when selecting the appropriate intravenous access method [4]. Previous reports indicate that the peripheral vein is the most commonly used intravenous access for inpatients, with intravenous indwelling needles (IIN) and peripherally inserted central catheters (PICC) utilized in 51.14% and 8.90% of cases, respectively [5]. Each of these two intravenous methods has distinct advantages and disadvantages. IINs are advantageous for their short indwelling time, low blood flow rate, and few severe complications; however, they require multiple punctures, which negatively impact patient experience and increase the risk of drug extravasation [6]. In contrast, PICC offers fewer punctures, is safe, simple to perform, and can remain in place for extended periods. However, its use is still limited in some settings, and challenges persist in its application for dialysis and hematology patients [7, 8]. As an essential part of nursing work, intravenous therapy should prioritize safety management and the advancement of specialized practices [9, 10]. This study aims to compare the effects of two intravenous therapy methods, IIN and PICC, administered by nurses with operational authority, in AL patients.

Methods

Eighty-six AL patients admitted to the First Affiliated Hospital of Baotou Medical College of Inner Mongolia University of Science and Technology from June 2022 to March 2023 were randomly divided into the IIN group or the PICC group using a random number table method, with 43 patients in each group. Before grouping, all patients were informed in detail about the two venous access methods, including the operation process, costs, and potential risks.

Regarding costs, the hospital covered the difference in puncture costs between PICC and IIN for patients in the PICC group. Regarding risks, patients were fully informed and signed informed consent forms. They were also made aware that they could withdraw from the study at any time if they were unwilling to assume the corresponding risks. After randomization, patients were promptly informed of their group al-

location and the corresponding treatment plan.

Inclusion criteria

- (1) Diagnosis meeting the criteria for China Adult Acute Lymphoblastic Leukemia or Acute Myeloid Leukemia [11, 12];
- (2) Age 18–70 years, with a life expectancy of more than 6 months;
- (3) Tolerated chemotherapy and provided informed consent;
- (4) Condition adaptation: Long-term intravenous infusion or drug infusion requirements exceeded than 7 days;
- (5) Vascular conditions: The veins should be unobstructed with larger diameter. There is no obvious abnormality in the blood vessels, such as deep vein thrombosis. It is recommended to choose upper limb veins. If there are no suitable upper limb veins, head and neck and lower limb veins can be selected;
- (6) Skin conditions: There is no obvious infection, ulcer or other skin lesions at the catheterization site.

Exclusion criteria

- (1) Severe cognitive dysfunction or complete lack of cooperation;
- (2) Presence of malignant tumors, blood system disorders, liver or kidney failure or other serious comorbid diseases;
- (3) Known allergy to catheter materials (such as silicone, polyurethane, etc.);
- (4) Severe coagulopathy: Patients with bleeding tendency or abnormal coagulation function may experience uncontrolled bleeding during catheterization or catheter blockage after catheterization;
- (5) Local infection or inflammation (such as infections, inflammation, or skin damage at the catheterization site);
- (6) Abnormal anatomical structure (such as vascular stenosis and distortion that can cause difficult catheter placement or catheter dislocation);
- (7) Poor cooperation or tolerance during the catheterization.

Both groups were treated by specially trained nursing staff, and all procedures were completed in accordance with the Operation Specification for Intravenous Therapy Nursing Technology [13]. The patients were informed about the catheterization process. All patients received the same chemotherapy regimen.

Acute myeloid leukemia protocol: Days 1–3: Intravenous infusion of daunorubicin (Manufacturer: Hanhui Pharmaceutical Co., Ltd., National Drug Approval No.: H33020925) at a dose of 45–60 mg/m² per day. Days 1–7: Intravenous infusion of cytarabine (Manufacturer: Pfizer Pharmaceuticals Wuxi Co., Ltd., National Drug Approval No.: H20205027) in two divided doses, 100–150 mg/m².

ALL protocol: Days 1, 8, 15, 22: Intravenous push of vincristine (Manufacturer: Guangzhou Baiyunshan Hanfang Modern Pharmaceutical Co., Ltd., National Drug Approval No.: H44023474) at a dose of 1.5 mg/m². Days 1–3: Intravenous infusion of daunorubicin (Manufacturer: Hanhui Pharmaceutical Co., Ltd., National Drug Approval No.: H33020925) at a dose of 30–45 mg/m² per day. Vincristine was administered as an intravenous injection on Day 1 and Day 8. Days 1–14: Oral administration of prednisone (Manufacturer: Shanghai Shangyao Xinyi Pharmaceutical Co., Ltd., (H31020605)) at a dose of 60 mg. Days 15–28: Gradual tapering and discontinuation of prednisone.

In the IIN group, an indwelling needle was used with the following procedure: the basilic vein or median elbow vein was chosen, and the smallest indwelling needle that met the therapeutic blood flow criteria was used. After successful puncture, 3 M adhesive tape was used for fixation; if the catheter remained intact, the dressing and heparin cap were replaced every 72 h.

In PICC group, a 4Fr safe PICC (purchased from BD, USA) was used. The operation was as follows: the patient was positioned supine with the arm extended at a 90-degree angle, and the head was tilted to one side to fully expose the puncture site. Among the 43 patients, 31 were treated via the cephalic vein approach, 12 via the basilic vein approach, and the forearm elbow was used as the puncture point. A 10 cm spiral disinfection was performed around the puncture site, both above and below, to ensure maximum sterility. The Seldinger technique was adopted, and the central venous catheter was advanced into the superior vena cava using a guide wire. The puncture site and exposed

portion of the catheter were secured with 3 M adhesive tape. The dressing was changed every week, and the catheter was flushed with 100 U/24 ml heparin solution 24 hours post-insertion.

Observation outcomes

Clinical outcome: The clinical outcome scale for AL patients, as reported by Lin et al. [14]. This scale includes 15 items covering physiology (7 items related to disease symptoms, 4 items related to treatment toxicity and side effects, and 4 items related to activities of daily living), psychology (5 items related to anxiety, 5 items related to depression, and 3 items related to feelings of inferiority), social factors (5 items related to social support), and treatment (5 items related to compliance and 4 items related to patient satisfaction). The scale includes four domains, nine clinical outcomes, and 42 items. The Cronbach's α coefficient was 0.796, and the content validity was 0.907. Each item was rated on a scale from 1 to 5, with 17 positive items scored positively, and 25 negative items scored negatively. The total score range for each domain was: 15–75 points (physiology), 13–45 points (psychology), 5–25 points (social factors), and 9–45 points (treatment), respectively. Higher scores indicate better clinical outcomes.

Nursing-related parameters: The number of punctures, cost of intubation, duration of maintenance treatment, and duration of puncture were recorded.

Vein-related complications: The incidence of complications was recorded, including bleeding (active bleeding present at the dressing site after 24 hours), thrombosis (confirmed by color Doppler ultrasound, with symptoms such as arm swelling), phlebitis (redness, swelling, heat, and pain at the puncture site), catheter-related bloodstream infection (symptoms such as skin redness, swelling, and pain at the insertion site, along with positive bacterial culture from the catheter), catheter obstruction, and other events. The total occurrence rate of these complications was calculated.

Statistics methods

Data were analyzed using SPSS 23.0 software. Measurement data ($\bar{x} \pm s$) (clinical outcomes, nursing-related parameters) were compared using a t-test. Count data (n, %) (vein-related complications) were analyzed using χ^2 tests. A P-value of <0.05 was considered statistically significant.

Table 1. Comparison of nursing-related parameters between the two groups ($\bar{x} \pm s$)

	IIN group	PICC group	t	P
General data	50	50		
Number of cases	43	43		
Puncture times (Times)	1.13±0.25	1.02±0.27	1.069	<0.050
One-time catheterization fee (Yuan)	74.26±14.25	2100.45±134.68	98.106	<0.001
Maintenance treatment time (d)	14.84±1.25	22.17±3.45	13.099	<0.001
Puncture time (min)	5.41±1.35	20.56±1.37	0.511	<0.050

Note: IIN, intravenous indwelling needles; PICC, peripherally inserted central catheters.

Table 2. Comparison of clinical outcomes between the two groups ($\bar{x} \pm s$)

	IIN group	PICC group	t	P
General data	50	50		
Number of cases	43	43		
Symptoms of disease	24.78±3.64	24.33±3.75	0.565	0.574
Toxic and side effects of treatment	12.15±3.23	12.26±3.18	0.159	0.874
Activity of daily living	14.25±2.37	14.18±2.45	0.135	0.893
Anxiety	17.34±2.03	20.39±2.18	6.714	<0.001
Depression	18.44±2.65	18.93±2.34	0.909	0.366
Inferiority complex	10.14±2.19	10.21±2.03	0.154	0.878
Social support	16.47±2.34	16.25±2.40	0.430	0.668
Compliance	17.68±2.38	20.34±2.67	4.877	<0.001
Satisfaction	15.43±2.06	17.31±2.15	4.140	<0.001

Note: IIN, intravenous indwelling needles; PICC, peripherally inserted central catheters.

Results

Comparison of nursing-related parameters between the two groups

There were no significant differences between the two groups in terms of the number of punctures or puncture time ($P>0.05$). The cost of catheter indwelling in IIN group was significantly lower than that in PICC group, but the maintenance treatment duration was significantly shorter in the IIN group ($P<0.05$, Table 1).

Comparison of clinical outcomes between the two groups

No significant differences were found between the two groups regarding clinical outcomes such as disease symptoms, toxicity and side effects, activities of daily living, depression, feeling of inferiority, or social support ($P>0.05$). However, anxiety, treatment compliance, and satisfaction were significantly lower in the IIN group compared to the PICC group ($P<0.05$, Table 2).

Complications between the two groups

The incidence of vein-related complications in the IIN group (25.58%) was significantly higher than that in the PICC group (6.98%) ($P<0.05$, Table 3).

Discussion

Chemotherapy, the primary treatment for AL,

often reduces white blood cell counts. Intravenous infusion is the main route of drug administration. As the drug dosage increases, it not only raises the risk of toxicity and side effects but can also cause significant stimulation and damage to blood vessel walls, which in turn affects treatment compliance and patient satisfaction [15, 16]. Clinically, patients with hematologic malignancies should choose more reliable vascular access methods [17].

Indwelling needles, a traditional intravenous infusion method, offer advantages such as simple operation and low cost. However, they have a short indwelling time, requiring frequent re-punctures. Repeated punctures of the thin-walled peripheral veins increase the risk of mechanical phlebitis and drug extravasation, leading to irritation. Mild extravasation can cause local redness, swelling, heat, and pain, while severe extravasation can result in skin and tissue damage, including necrosis. These complications elevate the physical, mental, and economic burdens on patients and can reduce their trust in and recognition with nursing, which hinders the overall treatment process [18].

PICC is an intravenous therapy performed through peripheral venous catheterization, with the catheter tip positioned in central veins such as the superior vena cava or subclavian vein [19, 20]. This technique has the advantages of simple operation, low cost, less vein puncture, and minimal drug stimulation on blood vessels. In addition, PICC provides medium- and long-

Table 3. Comparison of vein-related complications between the two groups [n (%)]

	IIN group	PICC group	χ^2	P
General data	50	50		
Number of cases	43	43		
Oozing blood	1 (2.33)	0 (0.00)		
Thrombosis	2 (4.65)	1 (2.33)		
Phlebitis	4 (9.30)	1 (2.33)		
Catheter-related bloodstream infection	3 (6.98)	0 (0.00)		
Catheter obstruction	1 (2.33)	1 (2.33)		
Incidence	11 (25.58)	3 (6.98)	5.460	0.019

Note: IIN, intravenous indwelling needles; PICC, peripherally inserted central catheters.

term intravenous infusion therapy, allowing patients to continue their normal activities even during chemotherapy's intermittent phases [21]. As the primary operators of intravenous infusion therapy, nurses should carefully select appropriate infusion tools and establish safe, effective vascular access for AL patients [22, 23].

The results of this study revealed no significant differences between the two groups in terms of the number of punctures. However, the cost of catheterization in the IIN group was significantly lower than that in PICC group, but the duration of maintenance treatment was significantly shorter than that in PICC group. These findings suggest that while PICC placement costs more, it has a longer. PICC catheters offer a wide range of applications, with long-term retention and extended maintenance time, making them ideal for AL patients with long-term chemotherapy needs. By enabling patients to leave the hospital with a PICC when their condition stabilizes, this method reduces the frequency of repeated punctures, thereby alleviating both pain and the economic burden on patients.

There were no significant differences between the two groups in terms of clinical outcomes, including disease symptoms, treatment-related toxicity and side effects, activities of daily living, depression, feelings of inferiority, or social support. However, anxiety, treatment compliance, and satisfaction in IIN group were significantly lower than those in PICC group. This finding highlights the significant effect of PICC in reducing anxiety and improving treatment compliance and satisfaction. Repeated punctures with intravenous indwelling needles not only increase patients' negative experiences and anxiety but also lead to a series of complications, such as limb vascular injury and muscle pain at the injection side due to irritation caused by drug extravasation. This results in psychological pressure on patients, undermining their confidence in treatment and rehabilitation, which in turn reduces patient compliance and satisfaction. However, PICC placement avoids drug-in-

duced vascular damage, protects peripheral veins, reduces puncture-related pain, and minimizes complication risks, thereby improving patient comfort and satisfaction, which is conducive to better treatment compliance [24, 25]. The incidence of vein-related complications in the IIN group (25.58%) was significantly higher than that in the PICC group (6.98%). This suggests that PICC placement is more effective in preventing vein-related complications. The intravenous indwelling needle tends to float within the vein, and long-term indwelling can cause mechanical rubbing of the vessel wall, increasing the risk of complications. In contrast, the PICC catheter is typically inserted in the upper arm, which is more accessible for maintenance and far from the respiratory tract, reducing the likelihood of catheter-related complications. In addition, the catheter tip is positioned deep in the vein, where blood flow is faster in the large vein, diluting chemical drugs and reducing friction against the vessel wall. This setup minimizes the risk of drug extravasation and damage to surrounding tissues or organs, making the procedure relatively safe. However, AL patients are at risk of PICC-related infections, and nursing staff should strictly adhere to PICC procedures and aseptic operation to minimize the risk of complications.

Conclusion

Compared to the intravenous indwelling needle, the use of a PICC in AL patients demonstrates more favorable outcomes. Although the cost of PICC catheters is higher, the extended maintenance treatment time effectively alleviates patient anxiety, reduces the risk of vein-related complications, and improves patient compliance and satisfaction. Therefore, PICC is worthy of clinical promotion.

However, this study has some limitations. The research primarily focuses on hematological patients, which limits the generalizability of the findings. Additionally, the treatment outcomes during hospitalization may be influenced by subjective factors, such as social factors, psy-

chological status, climate, and environmental factors, family circumstances, and economic status.

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Evidence-based care reduces lower-limb thrombosis and negative emotions while improving quality of life in post-hip arthroplasty patients

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Highlights

- Evidence-based care significantly reduces the incidence of lower-limb thrombosis and overall postoperative complications in hip arthroplasty patients.
- This care model effectively alleviates anxiety and depression, enhancing patients' psychological well-being during recovery.
- Patients receiving evidence-based care show improved quality of life, greater independence in daily activities, and higher nursing satisfaction.

Abstract

Objective: To explore the effect of evidence-based care on lower-limb thrombosis and negative emotions following hip arthroplasty. **Methods:** A total of 108 patients undergoing hip arthroplasty at our hospital were randomly assigned to the observation group (n=54, evidence-based care) and the control group (n=54, conventional care). Postoperative complications, negative emotions, quality of life, activities of daily living, and patient satisfaction were compared between the two groups. **Results:** The observation group had a lower incidence of lower-limb thrombosis and overall complications, as well as higher patient satisfaction than the control group (all $P < 0.05$). One month after discharge, patients in the observation group showed significantly lower scores on the Hamilton Anxiety Scale, the Hamilton Depression Scale, and activities of daily living scale, but with increased Generic Quality of Life Inventory-74 scores, compared with before intervention (all $P < 0.05$). **Conclusion:** Evidence-based care significantly relieves anxiety and depression, reduces the incidence of lower-limb thrombosis, and improves quality of life in patients after hip arthroplasty.

Keywords: Evidence-based care, hip arthroplasty, lower-limb thrombosis, negative emotion

Introduction

Hip arthroplasty is the primary treatment for femoral intertrochanteric fracture and femoral head necrosis. However, the implantation of a prosthesis and the need for prolonged bed rest after surgery inevitably lead to various postoperative complications, including deep venous thrombosis (DVT) of lower limbs [1]. Additionally, some patients may need revision surgery due to poor postoperative anastomosis, negatively affecting the quality of life (QoL) [2]. Ef-

fective perioperative care has been associated with reduced postoperative complications and the restoration of hip joint function.

Conventional nursing models primarily focus on managing the disease itself and addressing postoperative complications symptomatically, rather than emphasizing physical and mental health, as well as complication prevention [3]. Evidence-based care, a concept derived from evidence-based medicine, involves the implementation of optimal interventions based on



valuable and proven outcomes [4, 5]. It has been widely used in obstetrics and gynecology, general surgery, and orthopedics. Copanitsanou et al. proposed that evidence-based care promotes postoperative recovery of limb function after orthopedic surgery [6]. However, its role in preventing DVT in the lower limbs after hip arthroplasty and in addressing psychological disorders has been rarely explored. Therefore, this study aims to investigate the effects of evidence-based care on lower-limb thrombosis and negative emotions following hip arthroplasty.

Materials and methods

General data

A total of 108 patients undergoing hip arthroplasty at our hospital from January 2021 and April 2024 were recruited in this study. Patients were randomly allocated into two groups each receiving different postoperative nursing strategies: a control group (n=54, conventional care) and an observation group (n=54, evidence-based care). Inclusion criteria: patients aged 35-70 years; patients scheduled for hip arthroplasty; patients with a hospital stay >2 weeks. Exclusion criteria: patients with coagulation dysfunction or other serious diseases requiring urgent surgical treatment; patients with mental illness or epilepsy; patients participating in other concurrent studies; patients with incomplete clinical data. This study was approved by the Medical Ethics Committee of our hospital.

Methods

Patients in the control group received conventional care postoperative, including monitoring vital signs, administering prescribed medications, and instructing family members to assist with patient repositioning and leg lifting.

Patients in the observation group received evidence-based care, which involved the following steps:

- An evidence-based team was constructed to review literature, identify factors influencing postoperative thrombosis and poor psychological well-being, and implement targeted nursing interventions [7, 8].

Postoperative DVT care: long-term bed rest and restricted movement of the lower limbs, combined with local swelling of the affected limb after surgery, significantly reduce venous return velocity, leading to DVT [7]. To address this,

following interventions were implemented: (1) A soft pillow was placed under the affected limb to promote venous return; (2) The family members were instructed to massage the affected limb daily from top to bottom for 20 minutes per session, 3 times per day; (3) On postoperative day 2, patients were instructed to perform appropriate leg-lifting exercises or move the affected limb in bed, progressing to alternate leg raising on postoperative day 3. The duration and frequency of these activities were gradually increased over time; (4) Antithrombotic drugs were administered as prescribed by the physician; (5) Patients were instructed to continue daily leg-lifting exercises after discharge until they could freely move the affected limb.

- Postoperative psychological counseling: Given the long bed rest and concerns about prognosis after surgery, patients are prone to anxiety [8]. The rehabilitation process, which can be slow and challenging, is also a major factor contributing to irritability and anxiety. Accordingly, intervention measures were as follows: (1) Preoperative health education was provided by nursing staff to inform patients about surgery and possible post-operative complications. Daily communicate after surgery helped alleviate patient concerns and informed them that minor complications were normal reactions, thereby reducing anxiety; (2) Family members were instructed to provide extra care and emotional support during the rehabilitation process, enhancing the patient's sense of self-worth and helping to alleviate feelings of inferiority and irritability.

Outcome measures

Primary outcome measures

(1) Complications during hospitalization: The occurrence of complications such as lower-limb thrombosis, prosthetic dislocation, fat embolism, and periprosthetic fracture was recorded. Lower-limb thrombosis was diagnosed when patients presented with sudden pain and swelling in the lower limbs, which were then examined by color Doppler ultrasound. Positive Homan's signs indicated the presence of lower-limb DVT, characterized by sudden pain and swelling of the lower limbs, significant tenderness in the inner thigh, filling of superficial veins with tenderness along the deep veins, and a solid isoechoic mass, thickened venous wall, and slowed blood flow as identified by color Doppler ultrasound [9].

(2) Psychological assessment: Psychological evaluation was performed using the Hamilton

Table 1. Comparison of baseline data between the two groups (n, $\bar{x} \pm s$)

Index		Observation group (n=54)	Control group (n=54)	χ^2/t	P
Gender (n)	Male	27	22	0.934	0.334
	Female	27	32		
Age (years)		47.4 $\pm$ 4.9	48.2 $\pm$ 4.0	0.924	0.355
Primary diseases (n)	Femoral neck fracture	20	18	2.241	0.692
	Aseptic bone necrosis	10	15		
	Old fracture of shaft	9	7		
	Osteoarthritis	9	6		
	Rheumatoid arthritis	6	8		

Table 2. Comparison of postoperative complications between the two groups [n (%)]

Group	Observation group (n=54)	Control group (n=54)	χ^2	P
Lower extremity thrombosis	0 (0.00)	4 (7.41)	4.154	0.042
Prosthesis dislocation	1 (1.85)	2 (3.70)	0.343	0.558
Fat embolism	0 (0.00)	1 (1.85)	1.009	0.315
Periprosthetic fractures	1 (1.85)	1 (1.85)	0.000	1.000
Total incidence	2 (3.70)	8 (14.81)	3.967	0.046

Anxiety Scale (HAMA) and the 17-Item Hamilton Depression Scale (HAMD). Scores for the HAMA ranged from 0 (no anxiety) to 4 (very severe anxiety), while HAMD scores were classified as follows: 0–7=normal; 8–16=possible depression; 17–23=definite depression; over 24=severe depression [10, 11]. These assessments were conducted before intervention and at discharge. Anxiety and depression severity increased as scores rose.

Secondary outcome measures

(1) QoL was evaluated before the intervention and one month after discharge using the Generic Quality Of Life Inventory-74 (GQOLI-74) [12]. Material well-being was scored from 16 to 80, while the other three dimensions such as social, somatic, and emotional functioning were scored from 20 to 100. Higher scores indicated better QoL.

(2) The activities of daily living (ADL) was evaluated before the intervention and one month after discharge [13]. The ADL scale includes the Physical Self-Maintenance Scale (maximum score of 24 points) and the Instrumental ADL (maximum score of 32 points), with a total of 56 points. A higher score indicates better performance in daily activities.

(3) Patient satisfaction on nursing services was evaluated by filling a satisfaction questionnaire at discharge [14]. Satisfaction rate = (satisfied + moderately satisfied cases)/total cases*100%.

Statistical analysis

Data were processed using SPSS 22.0. Continuous data were expressed as mean $\pm$ standard deviation (Mean $\pm$ SD). Intra-group differences before and after treatment were compared using paired samples t-test, while inter-group comparisons were conducted using independent samples t-test. Categorical data were expressed as number/percentage (n/%) and analyzed by Chi-square test or Fisher's exact probability test. A P-value of <0.05 was considered statistically significant.

Results

Baseline data

There were no significant differences between the two groups in terms of gender, age, and primary diseases (all $P>0.05$), indicating that the two groups were comparable (**Table 1**).

Postoperative complications

In the observation group, the incidence of lower extremity thrombosis was 0%, and the overall complication rate was 3.7%. In the control group, the incidence of lower extremity thrombosis was 7.41% and the overall complication rate was 14.81%. The observation group had a significantly lower incidence of lower extremity thrombosis and overall complications compared to the control group ($P<0.05$) (**Table 2**).

Psychological state

There were no significant differences in the HAMA and HAMD scores between the two

Table 3. Comparison of HAMA and HAMD scores between the two groups before and after intervention ($\bar{x} \pm s$)

Group	Observation group (n=54)	Control group (n=54)
HAMA score (point)		
Before intervention	7.24±1.11	7.68±1.06
At discharge	5.49±1.24 ^{*&}	6.40±1.13 [*]
HAMD score (point)		
Before intervention	8.04±1.33	7.95±1.17
At discharge	5.70±1.16 ^{*&}	6.58±1.20 [*]

Note: Compared with before intervention, ^{*}P<0.05; compared with the control group at discharge, [&]P<0.05. HAMA, Hamilton Anxiety Scale; HAMD, Hamilton Depression Scale.

Table 4. Comparison of GQOLI-74 scores between the two groups before and after intervention ($\bar{x} \pm s$)

Group	Observation group (n=54)	Control group (n=54)
State of material life		
Before intervention	54.40±5.44	55.02±4.85
One month after discharge	65.66±5.76 ^{**}	60.05±4.93 [*]
Social function		
Before intervention	65.59±4.96	66.01±4.77
One month after discharge	73.33±4.95 ^{**}	71.36±5.39 [*]
Somatic function		
Before intervention	62.20±6.40	62.39±5.43
One month after discharge	68.84±6.22 ^{**}	65.40±4.85 [*]
Psychological function		
Before intervention	70.02±3.85	69.94±4.38
One month after discharge	80.33±3.48 ^{**}	73.36±4.75 [*]

Note: Compared with before intervention, ^{*}P<0.05; compared with the control group at one month after discharge, [#]P<0.05. GQOLI-74, quality of life inventory-74.

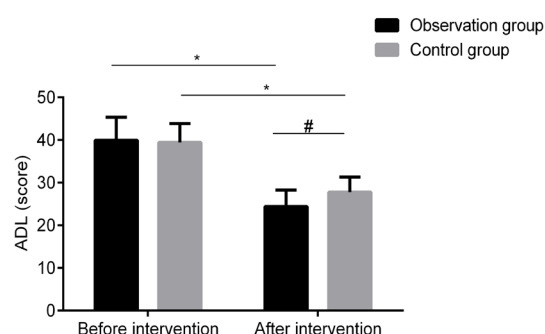


Figure 1. Comparison of ADL scores between the two groups before and after intervention. Compared with the same group before intervention, ^{*}P<0.05; compared with the Observation group and control group after intervention, [#]P<0.05. ADL, activitie of daily living.

groups before intervention ($P>0.05$). One month after discharge, patients in both groups showed reduced scores, with the observation group exhibiting significantly lower scores than the control group ($P<0.05$) (Table 3).

Quality of life

There were no statistical differences in GQOLI-74 scores between the two groups before intervention ($P>0.05$). After one month of intervention, scores increased in both groups, with a more significant improvement observed in the observation group ($P<0.05$) (Table 4).

Activities of daily living

Before intervention, the ADL scores were (39.95 ± 5.40) and (39.45 ± 4.39) in the observation and control groups, respectively, with no statistical difference between groups ($P>0.05$). One month after discharge, ADL scores decreased in both groups (24.40 ± 3.89 , 27.77 ± 3.56), with a greater reduction observed in the observation group ($P<0.05$) (Figure 1).

Patient satisfaction

Patient satisfaction was 96.30% in the observation group, significantly higher than 85.19% in the control group ($P<0.05$) (Table 5).

Discussion

High-quality, efficient, comprehensive, and me-

Table 5. Comparison of nursing satisfaction between the two groups [n (%)]

Group	Observation group (n=54)	Control group (n=54)	Z/ χ^2	P
Satisfied	31 (57.41)	23 (42.59)	4.876	0.087
Generally satisfied	21 (38.89)	23 (42.59)		
Dissatisfied	2 (3.70)	8 (14.81)		
Overall satisfaction rate	52 (96.30)	46 (85.19)	3.967	0.046

ticulous perioperative care plays a crucial role in reducing the risk of complications and accelerating recovery after hip arthroplasty [15, 16]. Evidence-based care is a nursing mode that minimizes the risk of postoperative complications and improves patient prognosis by reviewing extensive literature to identify factors that may influence patient recovery and applying effective nursing measures based on proven results [17, 18].

In the present study, the observation group experienced a lower incidence of postoperative lower-limb thrombosis and overall complications. After one month of intervention, the GQOLI-74 scores in the observation group were higher than those in the control group, while ADL scores were lower. These findings indicate that evidence-based care effectively reduced the risk of postoperative lower-limb thrombosis, lowers the incidence of postoperative complications, and improves ADL and QoL in patients undergoing hip arthroplasty during perioperative period. Consistent with our results, Monagle et al. reported that compared with conventional care, the perioperative use of evidence-based care greatly reduced the risk of postoperative DVT of lower limbs and enhanced the prognosis of orthopedic surgery patients [19]. A possible reason for these outcomes is that the leading cause of DVT, decreased venous return velocity due to prolonged bed rest and local swelling of the affected limb, was addressed before the implementation of nursing care, making the care more targeted. For example, placing a soft pillow under the affected limb postoperatively helps promote venous return, preventing lower limb DVT, which subsequently reduces postoperative complications, accelerates postoperative recovery, and improves QoL [20].

The lower HAMA and HAMD scores in the observation group suggest that evidence-based care effectively alleviates patients' anxiety and other negative emotions during the perioperative period. Benton et al. hypothesized that the significant improvement in postoperative psychological well-being achieved with evidence-based care is due to alleviating patients' concerns about prognosis induced by prolonged bed rest [21]. In addition, the lengthy and challenging rehabilitation process, to walk normally, neces-

sary for normal walking, is a major contributor to patients' irritability and anxiety. By addressing the factors that induce patients' unhealthy psychological status, targeted psychological counseling, including preoperative health education and postoperative care from their families, helps to eliminate patients' worries, nervousness, inferiority and irritability [22]. Furthermore, the satisfaction rate was significantly higher in the observation group, suggesting that patients who received hip arthroplasty were more satisfied with the evidence-based care.

Conclusion

Perioperative evidence-based care is closely associated with a reduced risk of lower-limb thrombosis and postoperative complications, improved negative emotions, and enhanced ADL and QoL in patients undergoing hip arthroplasty. However, as this study is a single-center study with a limited sample size and a short follow-up period, more in-depth studies with larger sample sizes and longer follow-up are needed to confirm the effects of evidence-based care on long-term psychological well-being and QoL of hip arthroplasty patients.

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