

# The Prevention of Venous Thromboembolism After Gynecological Surgery with Nursing Intervention Based on the G-Caprini Scale

Cui-Qin He<sup>1,\*</sup>, Hai-Yan Sun<sup>2,\*</sup>, Guo-Qin Feng<sup>3</sup>, Hai-Fang Li<sup>1</sup>, Dong-Lan Yuan<sup>1</sup>

<sup>1</sup>Department of Gynecology, Taizhou People's Hospital, Taizhou, People's Republic of China; <sup>2</sup>Department of Public Health Division, Taizhou People's Hospital, Taizhou, People's Republic of China; <sup>3</sup>Department of Nursing Department, Taizhou People's Hospital, Taizhou, People's Republic of China

\*These authors contributed equally to this work

Correspondence: Cui-Qin He, Department of Gynecology, Taizhou People's Hospital, No. 366 of Taihu Road, Pharmaceutical High-Tech District, Taizhou, 225300, People's Republic of China, Tel +8652386606295, Email hecuiqinhcq8@21cn.com; Dong-Lan Yuan, Department of Gynecology, Taizhou People's Hospital, No.366 of taihu Road,Pharmaceutical high-tech District, Taizhou, 225300, People's Republic of China, +86 0523 86606295, Email yandonglanydl@126.com

**Objective:** This study aimed to investigate the effect of nursing intervention based on the G-Caprini scale on the incidence of venous thromboembolism (VTE) after gynecological surgery and patients' satisfaction rate for nursing care.

**Methods:** Ninety-eight patients who attended Taizhou People's Hospital and underwent gynecological surgery between January 2021 and December 2021 were selected as subjects and divided into two groups according to a random number table, with 49 cases in each group. The control group was given conventional nursing care, and the experimental group received nursing intervention based on the G-Caprini scale. The rate of postoperative lower-limb deep-vein thrombosis in the two groups was compared, and the incidence of VTE and the level of nursing satisfaction in the two groups were statistically analyzed.

**Results:** The incidence of postoperative VTE in each risk class of the G-Caprini scale was lower in the experimental group than in the control group, and the difference was statistically significant ( $P < 0.01$ ). In the experimental group, 47 patients were very satisfied with the nursing care, 1 was satisfied, and 1 was dissatisfied, which meant the nursing satisfaction rate in the experimental group was 97.96 (48/49). In the control group, 40 patients were very satisfied with the nursing care, 2 were satisfied, 1 was basically satisfied, and 6 were dissatisfied; thus, the satisfaction rate for nursing care in the control group was 87.75%. The difference between the two groups was statistically significant ( $\chi^2 = 19.657$ ,  $p < 0.05$ ).

**Conclusion:** Nursing interventions based on the G-Caprini rating scale were significantly effective in preventing VTE in patients after gynecological surgery and resulted in higher levels of patient satisfaction in terms of nursing care.

**Keywords:** G-Caprini scale, nursing intervention, gynecological surgery, venous thromboembolism

## Introduction

Venous thromboembolism (VTE), which includes deep-vein thrombosis (DVT) and pulmonary embolism (PE), is the primary factor threatening a patient's life in the perioperative period.<sup>1</sup> Deep-vein thrombosis is the abnormal clotting of blood in the deep veins, which blocks the venous lumen and leads to venous return obstruction, causing clinical manifestations such as distal venous hypertension, limb swelling, pain, and superficial venous dilatation. The incidence of DVT after gynecological surgery is 9.6%–15.6%, and PE occurs in 46% of patients with DVT.<sup>2,3</sup> In Western countries, the incidence of DVT is reported to be as high as 10–40% in medical and surgical patients without preventive measures, and 40% of sudden deaths after gynecological surgery are attributed to PE secondary to DVT.<sup>4,5</sup> The prevention and treatment of VTE should focus on prevention, and prevention based on risk grading can improve the efficiency of prevention.<sup>6</sup> Qu et al<sup>2,7</sup> established the G-Caprini model for the risk grading of VTE after gynecological surgery based on data of Chinese people, which identified six risk factors independently associated with DVT after gynecological surgery, each of which was assigned a score of 1. Four sub-risk levels (low risk, medium risk, high risk and

very high risk) were established in relation to the total score, and the corresponding interventions were implemented clinically according to the patient's sub-risk level. In the present study, nursing interventions based on the G-Capri scale were given to patients undergoing gynecological surgery, and the rate of thrombosis was compared with the rate seen in patients who were cared for in the traditional manner. In the meantime, patients' satisfaction with the treatment process was evaluated by questionnaire.

## Materials and Methods

### General Data

Ninety-eight patients who attended Taizhou People's Hospital for gynecological surgery between January 2021 and December 2021 were selected for the study. All provided written informed consent, and the study was approved by the hospital's ethics committee. The subjects were divided into two groups according to a random number table, with 49 cases in each group. The age of the control group ranged from 18 to 70 years, with a mean age of  $(50.75 \pm 2.9)$  years; body mass measurements ranged from 41 to 86.5 kg, with a mean body mass of  $(66.76 \pm 3.1)$  kg, and the average height was  $(167.6 \pm 12.1)$  cm. There were 10 cases of open surgery, 30 cases of laparoscopic surgery, 6 cases of hysteroscopic surgery, and 3 cases of loop electrosurgical excisional procedure (LEEP) knife surgery. The mean age of the experimental group was  $(51.84 \pm 2.7)$  years, ranging from 15 to 68 years; body mass measurements ranged from 41 to 90 kg, with a mean body mass of  $(65.84 \pm 3.3)$  kg, and the average height was  $(167.3 \pm 11.8)$  cm. There were 12 cases of open surgery, 28 cases of laparoscopic surgery, 7 cases of hysteroscopic surgery, and 2 cases of LEEP knife surgery.

The exclusion criteria were as follows: those with VTE prior to admission; those with a previous history of thrombotic disease; those with malignant tumors; those with speech impairment; those without civil capacity; those with coagulation disorders, and those who had incomplete clinical data or difficulty cooperating with this study. The difference between the two groups in terms of general data was not significant ( $p > 0.05$ ).

### Nursing Methods

#### The G-Capri Scale

Patients were scored on six factors (age  $\geq 50$  years, hypertension, varicose veins, operative time  $\geq 3$  h, postoperative bed rest  $\geq 48$  h, and open surgery),<sup>2</sup> with one point for each factor (see Table 1). The scores were added together to obtain the total, which was divided into four levels (low risk, medium risk, high risk and very high risk) (see Table 2).

**Table 1** G-Capri Scale

Item	Present	None
Age $\geq 50$	1	0
Hypertension	1	0
Varicose veins	1	0
Duration of operation $\geq 3$ h	1	0
Postoperative bed rest $\geq 48$ h	1	0
Open surgery	1	0

**Table 2** G-Capri Scale Risk Class and DVT Incidence

Risk Class	Score	Incidence of Postoperative DVT (%)
Low risk	0	0.43
Medium risk	1	3.31
High risk	2	5.36
Very high risk	$\geq 3$	28.31

## Two Groups Were All Given the Following Nursing Care

Routine preoperative preparation, postoperative bed-based active and passive exercises, and assistance getting out of bed as soon as possible after surgery.

Basic preventive care: ensuring an adequate effective circulating blood volume to avoid hemoconcentration; carrying out precise, accurate, and rapid operations to shorten surgery time; avoiding the use of hemostatic drugs as much as possible in the postoperative period, and encouraging active early postoperative bed activities and early floor-based activities.

## The Following Interventions Were Implemented with Respect to the Care of the Experimental Group

① A risk assessment was carried out, and the patients were classified as low risk, medium risk, high risk, and very high risk based on the G-Capri scale. The assessment was completed within 24 h of admission and within 6 h for transferred and postoperative patients.<sup>8</sup>

② Information concerning the high-risk patients was automatically sent to the medical staff's workstations, and the doctors there were reminded to take preventive measures.

③ Pre-operative psychological care and pre-operative guidance were given to the patients. This meant the pre-operative nursing staff took the initiative to communicate with the patients, establishing trust, telling the patients about the specific surgical procedure, and assisting patients in deciding on a treatment plan; they comforted the patients and explained any disease-related information, the pre- and post-operative precautions, the prognosis of the surgery, and the purpose of examination, treatment, and care so that the patients would be more cooperative and gain confidence in overcoming the disease. The nursing staff encouraged the patients to learn about VTE by reading online information and watching videos, and they distributed the hospital's thrombosis prevention and control manual to increase patient awareness of VTE prevention. The monitoring of elderly patients, those with varicose veins, those with diabetes, and those with a predicted lengthy surgery time was increased, and nursing staff were expected to empathize with patients and encourage them to express their concerns.

④ Different interventions were implemented according to the patient's VTE risk. Low-risk patients were given basic preventive care, such as early postoperative activities, ankle pump exercises, so that they can get out of bed earlier. Medium-risk patients received mechanical preventive care, such as the use of antithrombotic elastic stockings (AES) and air-pressure-wave therapy devices. Mechanical preventive care combined with pharmacological preventive care was offered to high-risk and very high-risk patients.

⑤ Precautions were taken with regard to the use of AES. Contraindications were monitored, care was taken in choosing the appropriate AES length (thigh type or below-knee type) (using the judgment of the medical staff and patient preferences). A trained healthcare provider demonstrated the correct use of the AES. The patients had to wear the AES all the time until their activity levels returned to normal, but the AES had to be removed once or twice a day to assess the state of lower limbs in order to avoid any skin damage.

⑥ Certain precautions were also taken with regard to the use of an air-pressure-wave therapy instrument. In the absence of contraindications, a suitable instrument, such as the DSM-7S therapy instrument made in Korea, was used. Leg wears were placed around the patient's lower limbs, and the air pressure was gradually increased and set according to the patient's comfort and tolerance level. The patient's ankles, calves, and thighs were treated in sequence for 30 min, twice a day.<sup>9</sup> The surface of the air bags was wiped with 75% ethanol or chlorine-containing disinfectant after use to prevent cross infection.

⑦ Drugs were also used to prevent thrombosis, but an initial assessment was made of renal function, prothrombin time, and activated partial thromboplastin time before any drugs were administered. After the patient started drug therapy, its effects were closely monitored,<sup>10</sup> as were any laboratory test results. Records were kept, and any bleeding was reported immediately. The abdominal wall was preferred for subcutaneous low-molecular-weight heparin (LMWH) injection, and the injection site was changed regularly.<sup>11</sup> Patients were also given health education concerning the drugs they were taking; they were taught about the importance of taking medication on time as prescribed and not arbitrarily adjusting medication doses or stopping medication.

⑧ Other postoperative interventions included close monitoring of the patient's skin and body temperature as well as any swelling of the lower extremities, which were reported immediately.

⑨ In terms of dietary care, before surgery, the patients were given vitamins, proteins, and high-calorie foods, but high-fat foods were kept to a minimum, and spicy, cold, and other stimulating foods were prohibited. After surgery, liquid food was given depending on whether or not the patient was ventilated, and this diet gradually transitioned to semi-liquid and normal food.

## Evaluation Indexes

The incidence of postoperative lower-limb DVT in the two groups of patients was recorded. The judgment criteria for lower-limb DVT were as follows: whether patients had pain, edema, and superficial varicose veins in the lower extremities after surgery; whether strong echogenicity in the lumen of the veins of the lower extremities was seen in the color ultrasound, and whether there was any blood flow after pressure was applied.

Patient satisfaction with nursing care was evaluated with a anonymous scale which included 16 questions with 4 dimensions: nursing technology level, nursing quality, service attitude and pertinence of nursing services (Table 3). Each question has three options indicating the degree of satisfaction, and -1, 0, 1 point was given according to the patient's satisfaction with nursing. The questionnaire is distributed by the ward round nurse. After answering, the patient inputs it into the mailbox set up in a fixed position. The total score was counted and the patients were divided into three categories according to the satisfaction score: very satisfied, basically satisfied and dissatisfied.

## Statistical Analysis

SPSS 18.0 software was used for the statistical analysis. The count data (n%) were compared using an  $\chi^2$  test, and  $p < 0.05$  was considered a statistically significant difference.

## Results

### Incidence of Lower-Limb Deep-Vein Thrombosis

There were 49 cases in the experimental group, of which 2 patients experienced lower-limb DVT after surgery. This was an incidence rate of 4.08% (2/49). Of the 49 cases in the control group, 10 patients had lower-limb DVT after surgery, which was an incidence rate of 22.4% (10/49). The difference between the groups was significant ( $P < 0.05$ , Table 3).

### Incidence of Postoperative Lower-Limb Deep-Vein Thrombosis in Each Caprini Risk Class in the Observation Group

There were 49 patients in the experimental group. As the corresponding nursing measures are the same, the low-risk and medium-risk patients are combined, and the high-risk and very high-risk patients are combined. Among the 23 cases of low-risk patients and 20 cases of medium-risk patients, there was 1 case of lower-limb DVT, which presented an incidence rate of 2.32% for these two groups together. There were 6 high-risk or above patients, and 1 case of lower-limb DVT occurred in this group, which resulted in an incidence rate of 16.67%. The difference in the incidence of lower-limb DVT of each risk class after surgery was significant in the experimental group ( $P < 0.05$ , Table 4).

**Table 3** Incidence of Lower-Limb Deep-Vein Thrombosis [n (%)]

	Cases	Incidence
Control group	10 (49)	22.4%
Experimental group	2 (49)	4.08%
		$P < 0.05$

**Table 4** Incidence of Postoperative Lower-Limb Deep-Vein Thrombosis in Each Caprini Risk Class in the Observation Group [n (%)]

Risk Class	Cases	Incidence
High-risk and very high-risk	1 (6)	16.67%
Low-risk and medium-risk	1 (43)	2.32%
		$P < 0.05$

## Survey of Nursing Satisfaction in Control Group and Experimental Group

The questionnaire shown in Table 5 was used to investigate the nursing satisfaction of inpatients in our hospital. A total of 98 questionnaires were sent out, and 98 valid questionnaires were recovered, with a recovery rate of 100%. Results as shown in Table 6, there was significant difference in nursing satisfaction between the experimental group and the control group ( $\chi^2 = 19.657$ ,  $P < 0.05$ ).

**Table 5** Inpatient Satisfaction with Nursing Service Scale. Dear Patient Friends, in Order to Improve the Nursing Technology Level, Improve the Nursing Quality and Improve the Nursing Service Attitude of Taizhou People's Hospital, We Hereby Invite You to Participate in the Anonymous Questionnaire of Nursing Satisfaction in Your Busy Schedule. Thank You for Your Support and Cooperation. I Wish You a Happy Work and Life!

1	When you first arrived in the ward, did any nurses take the initiative to introduce you to the hospitalization environment and precautions?	Active introduction	Introduction after inquiry	No introduction
2	Do nurses respect you during hospitalization?	Very respectful	Respectful	Disrespect
3	During hospitalization, did the nurse listen to you carefully?	Always	Often	Seldom
4	During hospitalization, could you understand what the nurse said clearly?	Always	Often	Seldom
5	Is your ward quiet?	Very quiet	Quiet	Not quiet
6	Are your ward and toilet clean?	Very clean	Clean	Not clean
7	Did you get help in time after you rang the bedside call bell?	Always	Often/Not required	Seldom
8	When you do not need a red light call, can the nurse often visit the ward to understand your needs?	Always	Often/Not required	Seldom
9	According to the degree of your pain, has the nursing staff taken different targeted methods to help you relieve it?	Always	Often/Not required	Seldom
10	During each medication (including oral and injection), did the medical staff tell the name and function of the drug?	Always	Often/Not required	Seldom
11	When taking medicine for the first time (including oral and injection), did the medical staff tell the effect and precautions of this medicine?	Always	Often/Not required	Seldom
12	During the nursing operation, will the nurse pay attention to the use of curtain, shelter and other ways to protect your privacy?	Always	Often/Not required	Seldom
13	When you have check-ups during your hospitalization, does the nurse guide and arrange your check-up?	Always	Often/Not required	Seldom
14	Do you think the nursing services you receive have been adjusted more specifically according to the characteristics of your symptoms?	Always	Often	Seldom
15	Do you think nurses are skilled in operation?	Very skilled	Skilled	Not skilled
16	Do you think the targeted nursing measures taken by nurses are often effective?	Always	Often	Seldom

**Table 6** Inpatient Satisfaction with Nursing Service

Group	n	Very Satisfied	Satisfied	Dissatisfied	Satisfaction%
Control group	49	40 (81.63)	3 (6.12)	6 (12.24)	87.75 (43)
Experimental group	49	47 (95.91)	1 (2.04)	1 (2.04)	97.96 (48)
$\chi^2$					16.657
P					P<0.05

## Discussion

Deep-vein thrombosis and PE are two manifestations of the same disease in different stages and at different sites.<sup>12</sup> Patients undergoing gynecological surgery have a relatively high probability of developing lower-limb DVT. The incidence of slow pelvic blood flow is higher because of the rich venous vessels in the pelvic area of the body and the thin venous vessel walls. Since gynecological surgery is extensive and lengthy, the probability of intraoperative damage to the vessel wall is high, and intraoperative anesthetic treatment can lead to increased vascular tone and reduced blood flow. In addition, patients require extensive bed rest to recover after surgery. All these factors contribute to the high incidence of lower-limb DVT in patients after gynecological surgery.<sup>13</sup> However, VTE can be prevented and controlled.

Standardized VTE preventive care and management are important guarantees of VTE prevention and are of great significance in reducing the incidence of VTE. However, the risk of VTE in patients undergoing gynecological surgery can be effectively assessed using the G-Caprini scale, and preventive care can be targeted for patients according to their risk class, thus significantly reducing the incidence of postoperative lower-limb DVT. The preoperative risk assessment of gynecological patients using the G-Caprini scale can help medical staff to develop personalized nursing interventions for patients and prepare them adequately for possible intraoperative and postoperative problems. In this study, the incidence of lower-limb DVT in the observation group was 4.08%, which was lower than that of the control group (22.4%), indicating that nursing interventions based on the G-Caprini scale can effectively reduce the incidence of VTE (especially DVT). This is because the G-Caprini scale can help nursing staff to provide anticipatory nursing interventions for different populations, such as basic prevention, mechanical prevention, and pharmacological prevention, and effectively improve patients' knowledge about surgery and VTE through dietary guidance, preoperative psychological care, and health education, which in turn can prepare them psychologically. The nursing staff can provide effective psychological guidance to patients to reduce their adverse emotions and improve their compliance and satisfaction with treatment and care.

## Conclusion

In this study, the incidence of lower-limb DVT was highest in high-risk or higher-risk patients and lowest in intermediate-risk and low-risk patients, indicating that healthcare providers need to strengthen their observations of and interventions in high-risk or higher patients' care.

It is hoped that this study provides evidence that the use of a more scientific and practical VTE assessment tool, namely, the G-Caprini scale, is beneficial for patients after gynecological surgery, offering assistance to gynecological nursing staff in their practice of VTE preventive care.

The study still has some limitations, because the g-caprini scoring scale is suitable for patients with gynecological surgery, but there are also patients with gynecological malignancies, accounting for a certain proportion. In the process of use, it is found that if there are patients undergoing surgery due to gynecological malignancies, the practicability of the scale is not as good as the surgical caprini scoring scale, because there are separate scoring items of malignancies in the surgical caprini scoring scale.

## Disclosure

The authors report no conflicts of interest in this work.

## References

1. Lang JH, Qu H, Zhang ZY, et al. Expert consensus on the prevention of deep venous thrombosis and pulmonary embolism after gynecological surgery. *Chin J Obstet Gynecol.* 2017;52(10):649–653.
2. Qu H, Li Z, Zhai Z, et al. Predicting of venous thromboembolism for patients undergoing gynecological surgery. *Medicine.* 2015;94(39):e1653.
3. Liu YZ, Zhang ZY, Guo SL, et al. Prospective investigation of postoperative lower extremity deep venous thrombosis in gynecological procedures. *Chin J Obstet Gynecol.* 2006;41(2):107–110.
4. Geerts WH, Pineo GF, Heit JA, et al. Prevention of venous thromboembolism: the seventh ACCP Conference on antithrombotic and thrombolytic therapy. *Chest.* 2004;126:338S–400S. doi:10.1378/chest.126.3\_suppl.338S
5. Davis JD. Prevention, diagnosis, and treatment of venous thromboembolic complications of gynecologic surgery. *Am J Obstet Gynecol.* 2001;184(4):759–775. doi:10.1067/mob.2001.110957
6. Qu H, Zhang ZY. Prevention of venous thromboembolism in gynecological surgery. *Chin J Pract Gynecol Obstet.* 2018;7:717–721.

7. Zhang SJ, Lin D, Lin LL, et al. The use of goal attainment scaling in the acupuncture of children with intellectual disability. *World J Tradit Chin Med.* 2022;8:522–529
8. International vascular Union China branch nursing professional committee. Expert consensus on prevention, nursing and management of venous thromboembolism in hospitalized patients. *Nurs J Chin People's Lib Army.* 2021;38(6):17–21.
9. Wan WJ, Wang YF, You F, et al. Effect of air pressure wave therapy combined with Motomed lower extremity training on lower extremity deep venous thrombosis after stroke. *Chin J Phys Med Rehabil.* 2021;43(6):523–525.
10. Pulmonary embolism and pulmonary vascular disease group of respiratory branch of Chinese Medical Association, pulmonary embolism and pulmonary vascular disease working committee of respiratory branch of Chinese Medical Association, national cooperation group for the prevention and treatment of pulmonary embolism and pulmonary vascular disease. Guidebooks for diagnosis, treatment and prevention of pulmonary thromboembolism. *Natl Med J China.* 2018;98(14):1060–1087.
11. Ma YF, Deng HB, Wang XJ, et al. Expert consensus on nursing prevention and control of venous thromboembolism in adult patients with coronavirus disease 2019. *Aging Med.* 2020;55(5):666–670.
12. Expert Committee of thrombus and vascular special fund of China Health Promotion Foundation. Consensus of Chinese experts on mechanical prevention of venous thromboembolism. *Natl Med J China.* 2020;100(7):484–492.
13. He CQ, Chen XP. Effect of Autar scale based nursing intervention in prevention of deep venous thrombosis patients with gynecology surgery. *J Clin Med Pract.* 2016;20(22):113–115.

International Journal of Women's Health

Dovepress

### Publish your work in this journal

The International Journal of Women's Health is an international, peer-reviewed open-access journal publishing original research, reports, editorials, reviews and commentaries on all aspects of women's healthcare including gynecology, obstetrics, and breast cancer. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/international-journal-of-womens-health-journal>