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Research Article

The Best-Evidence of Cluster Nursing Prevention Strategies for Perioperative Venous Thrombosis in Patients with Gynecological Cancer

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Abstract

Objective: To comprehensively retrieve, evaluate, and summarize the best evidence of bundle nursing prevention strategies for perioperative venous thrombosis in patients with gynecological cancer. Methods: The National Guideline Library NGC, the Australian JBI Center for Evidence-based Health Care (JBI EBP), the Scottish InterCollege Guidelines Network (SIGN), the Registered Nurses Association of Ontario (RNAO), and the Canadian Clinical Practice Guidelines Network (CMA) were searched by computer INFOBASE), New Zealand Clinical Practice Guidelines Study Group (NZGG), ClinicalKey for Nursing, TRIP Database, Best Practice, Nursing Consult, The Cochrane Library, Pubmed, Chinese Biomedical Literature Database (CBM), Medical Pulse, MJ Best Practice, UpToDate, PubMed, Web of The literature on prevention and treatment strategies of deep vein thrombosis in perioperative patients with gynecological tumors in the Science core database, Wanfang database, CNKI database and other databases were evaluated and extracted by two researchers independently. Results: 12 articles were included, including five guidelines, four expert consensus, and three systematic reviews. Twenty-one best pieces of evidence were summarized from three aspects: before, during, and after surgery. Conclusion: This study summarizes the best evidence of cluster nursing prevention strategies for perioperative venous thrombosis in patients with gynecological cancer, which can provide a basis for clinical medical staff.

Keywords: Gynaecological Tumor; Deep Vein Thrombosis; Evidence-Based Nursing; The Perioperative Period; Summary of Evidence.

Introduction

Venous Thromboembolism (VTE) refers to a condition in which blood clots in the lumen of a vein in the body, resulting in complete or incomplete occlusion of a blood vessel, including Deep Venous Thrombosis and Pulmonary Embolism (1). According to the International

Society on Thrombosis and Hemostasis (ISTH), the annual incidence of VTE globally is between 0.75% and 2.69% (2). Venous thrombosis is the second leading cause of death in cancer patients after the tumor, and relevant studies have shown that 50% of thrombosis occurs during the operation (3).

Due to the unique anatomical structure of the female abdomen and pelvis, relatively dense veins, thin vessel walls, and rare venous valves, the lithotomy position is often taken as the primary position during surgery, and there are other personal factors such as BMI exceeding the average value, high age, menopause, etc. These problems can indirectly or directly lead to a higher incidence of perioperative venous thrombosis in patients with gynecological tumors than in other abdominal and pelvic surgeries (4). If it is not diagnosed and treated in time, it will lead to thrombus detachment. At that time, the thrombus will reach the pulmonary artery with blood circulation, leading to limb swelling, pain, prolonged hospitalization, or readmission due to prolonged treatment, which seriously affects the rehabilitation and quality of life of patients and may cause fatal PE (5). In recent years, some scholars have gradually realized the importance of preventing and treating intraoperative venous thrombosis. However, the preventive measures are all single, such as preoperative or postoperative, or just the basic perioperative prevention process. This is related to the lack of perioperative bundle nursing prevention strategy for gynecological tumor patients with venous thrombosis, the lack of nursing management related to the prevention of venous thrombosis, and the lack of understanding of intraoperative prevention of venous thrombosis. Therefore, this study aims to explore the best evidence summary of perioperative venous thrombosis in patients with gynecological tumors to prevent and manage perioperative venous thrombosis in patients with gynecological tumors and reduce the incidence of thrombosis (6). If we attach importance to prevention and strengthen multidisciplinary cooperation, the harm of perioperative venous thrombosis in gynecological tumor patients can be effectively reduced (7).

1. Materials and Methods

1.1 Formulation of evidence-based questions

Evidence-based questions were constructed based on the PIPOST model. P (Population): patients over 18 years old diagnosed with gynecological cancer; I (Intervention): perioperative cluster-related nursing intervention (assessment, screening, diagnosis, intervention methods, health education, etc.) was used for nursing; P (Professional): clinical health care providers; O (Outcome): incidence of DVT, D-dimer level, NRS pain score, degree of limb swelling, and patients' knowledge, attitude and practice of DVT (8); S (Setting): gynecological oncology department and operating room; T (Type of Evidence): clinical decision, practice guideline, expert consensus, evidence summary, and systematic review.

1.2 Retrieval Procedures and Strategies

The "6S" evidence resource pyramid model proposed by Brain Haynes (9). in 2009 is the most common model for classifying evidence resources in evidence-based nursing. The retrieval time was from the establishment of the database to June 2023. English search terms: ("Tumor" OR "Cancer" OR "Female Genital Neoplasms" OR "Vascular Neoplasms" OR "Hematologic Neoplasms" OR "Uterine Neoplasms "OR" Vaginal Neoplasms "OR" Endometrial Neoplasms "OR" Abdominal Neoplasms") AND ("Gynae" OR "Gynecology" OR "Gynecologic Surgical Procedures") AND ("Perioperative Period" OR "Intraoperative Period " OR "Preoperative. Period" OR "Preoperative Care" OR "Intraoperative Complications" OR "Postoperative Period" OR "Perioperative Nursing" OR "Perioperative Care" OR "Perioperative Medicine") AND ("Thromboembolism" OR "Thrombosis" OR "Embolism and Thrombosis" OR "Venous Thromboembolism" OR "Venous Thrombosis" OR "Upper Extremity Deep Vein Thrombosis") AND ("Nursing Care" OR "Nursing"

OR "Medical-Surgical Nursing" OR "Primary Nursing" OR "Holistic Nursing" OR "Operating Room Nursing" OR "Oncology "Nursing" OR "Patient Care Bundles" OR "Evidence-Based Nursing" OR "Risk Management" OR "Hospital Administration" OR "Clinical Governance"). The search method is based on the combination of subject words and free words, and "snowball" and other methods are used to assist the search (10).

1.3 Inclusion and exclusion criteria of Literature

Inclusion criteria: ① The study subjects were patients with gynecological tumor surgery; ② Relevant Literature on gynecological thrombosis prevention published at home and abroad, including evidence-based guidelines, best practice information manuals, recommended practices, evidence summaries, systematic reviews, expert consensus opinions, etc; ③ The language of publication is Chinese or English.

Exclusion criteria: ① Literature that could not provide complete data results; ② patients with confirmed thrombosis; ③ twice published and low-quality Literature. Two researchers screened the Literature independently, by title and abstract, and re-screened by reading the full text. When opinions differed, the group discussed and got the final results.

1.4 Evaluation Methods of evidence quality

1.4.1 Guidelines

An appraisal of guidelines for research and evaluation (AGREE II) (11) was adopted. It included 23 items in 6 dimensions of "scope and purpose," "stakeholder involvement," "rigor of formulation," "clarity and readability," "applicability," and "editorial independence." The score of each item ranges from 1 to 7 points, and the higher the score, the higher the item's compliance. The percentage for each dimension was calculated using the formula: (score obtained -lowest score)/(highest score -lowest score) × 100%. Recommendation basis: The standardized percentage of each dimension > 60% was grade A (strongly recommended); The standardized percentage of ≥3 dimensions was 30%-60% as grade B (recommended); The standardized percentage of ≥3 dimensions < 30% was grade C (not recommended). Level A and level B evidence were included in this study.

1.4.2 Systematic evaluation

The criteria corresponding to the JBI Evidence-based Health Care Center (2016) in Australia were used for evaluation. There are 11 items; evaluators need to make "yes," "no," "unclear," and "not applicable" judgments on each item and finally decide whether the study is included or not after group discussion (12).

1.4.3 Randomized control

The evaluation criteria corresponding to the Australian JBI Evidence-based Health Care Center (2016) were used.

1.4.4 Expert consensus/opinion

The evaluation criteria corresponding to the Australian JBI Evidence- based Health Care Center (2016) were used for evaluation. There are six items; evaluators need to make "Yes," "No," "Unclear," and "Not applicable" judgments on each evaluation item, and finally decide whether the study should be included or not after group discussion.

1.5 Literature quality evaluation process

The evidence was graded according to the 2014 evidence grade system of the Australian JBI Evidence-based Health Care Center (13). The Level of evidence was divided into Level 1 to Level 5. The recommendation level was determined based on the feasibility, suitability, clinical significance, and effectiveness combined with the JBI evidence recommendation level judgment criteria and the discussion of group members. When the evidence is difficult to determine, or the conclusions are conflicting, this study is conducted strictly by the principles of evidence-based evidence, high-quality

evidence, and the latest published authoritative literature.

1.6 Summary of Evidence

The pooled integration method was used to integrate the evidence. Recommendations and suggestions are similar: choose a concise language to recommend adoption. Recommendation and recommendation complementary effects: merging. Conflicting recommendations:Select evidence that is of high quality and new. Search for sources that recommend various opinions in different places.Find out the reasons for conflicts.Conduct a systematic review if necessary.Content-independent related items retain the original language. It will be split if several levels are involved in this recommendation (14).

2 Results

2.1 Search results

A total of 12 articles were included, The search results are shown in Figure 1.

2.2 General data characteristics of the included literatures

The general data characteristics of the 12 literatures and other relevant details. See Table 1 for details.

2.3 Results of literature quality evaluation

2.3.1 Guideline evaluation results

A total of 5 practice guidelines included in this study.See Table 2 for details.

2.3.2 Results of systematic review

3 systematic reviews were included in this study. See Table 3 for details.

2.3.3 Expert consensus evaluation results

5 expert consensuses were included in this study. See Table 4 for details (Table 4 is placed in the supplementary material.)

2.4 Evidence extraction

The included evidence was classified in detail using the JBI evidence-level classification method (2014 version). The evidence level was divided into 1 to 5 according to the different types of research design, and the recommended level was further divided into levels A and B according to the rigor and reliability of the research design. （more detail in Table 5，Because the number of ICONS is out of order. Table 5 is placed in the supplementary material.）

Discussion

3.1 Analyze the "preoperative" part

The evidence from 1 to 8 summarizes the selection of preoperative evaluation screening and prevention time in the perioperative period of patients with gynecological cancer. The evidence suggests that if patients with gynecological cancer undergo surgery under general anesthesia or semi-anesthesia, nurses should take the Caprini risk assessment scale in time and apply it on admission and when the patient's condition changes. As the first step, risk screening and evaluation not only lay the foundation for formulating targeted countermeasures in the future but also mainly aim to measure the consequences and severity of risk factors through scales before the start of the perioperative period.

3.2 Analyze the "intraoperative" part

Articles 9 to 12 of evidence summarized the intraoperative prevention of gynecological tumor patients. From the perspective of the timing of VTE protection during the whole peripheral surgery, it is recommended that angiography should be performed after preoperative assessment of the scale, and mechanical protective equipment such as elastic stockings should be selected according to the patient's condition. During the operation, it is recommended that the operating room nurse reassess the risk of VTE and appropriately reduce

the head and leg cushions to promote blood reflux according to the specific situation. The Caprini risk assessment scale can continuously assess the risk of VTE after the operation, and corresponding safety measures can be taken according to the results of the VTE risk assessment. In summary, it is recommended that nurses use experimental evidence in clinical practice to evaluate and analyze VTE assessment results and prevention and treatment opportunities in a timely and rational manner, especially regarding quality control, implementation, and feasibility.

3.3 Analyze the "postoperative" part

Articles 13 to 21 of the evidence summarized the preventive management measures for patients with gynecological tumors during the postoperative period. The evidence suggested that in promoting the clinical implementation of preventive management measures, dual prevention, namely physical prevention and drug prevention, should be combined to prevent deep vein thrombosis in patients with gynecological tumors during the perioperative period. For early ambulation and exercise after surgery, it is recommended to make appropriate and personalized plans according to the patient's tolerance. Implementing VTE prevention and management measures is the most critical and challenging link in nursing work. Evidence suggests establishing a multidisciplinary team for VTE prevention in the department to promote it collectively, implement and follow up the improvement plan, repeatedly summarize, comprehensively evaluate the application effect, and conduct regular quality reviews. In addition, active health education for gynecological cancer patients during the perioperative period is also critical. Evidence suggests that the form and process of thorough health education can significantly improve the knowledge of VTE prevention of patients and their families. Nurses should think about the appropriate targeted health education model from the perspective of patients and their caregivers and control the timing, frequency, content, evaluation, and other links to achieve sound health education effects. Furthermore, when searching the literature, it was found that in the prevention and management of VTE, drug prevention was more popular, such as rivaroxaban, tranexamic acid, low molecular weight heparin, and other drugs, while mechanical prevention and nursing prevention were few and mostly used descriptive studies, and the evidence content was relatively thin. In the next step, the scope of research on mechanical devices and nursing prevention can be expanded, and the effects and benefits of mechanical devices and nursing prevention can be further explored.

4 Innovation and limitations of this study

To summarize the best evidence of cluster nursing prevention strategy for perioperative venous thrombosis in patients with gynecological cancer based on evidence-based concept, Medical staff should pay attention to such patients and focus on the intervention from three aspects before, during, and after surgery to improve the clinical outcomes of patients.

Shortcomings: The grey literature database was not searched when constructing the protocol literature search in this study, and supplementary searches are needed in the future to ensure the completeness of the evidence.

Conclusion

Evidence summary has guiding significance for clinical nursing practice (15). Perioperative nursing of gynecological cancer patients is diversified, comprehensive, and long-term nursing, which helps patients prevent VTE and is an evidence-based program that is beneficial to the prognosis and health of patients (16).

This study is only the first step in evidence-based nursing. How to intervene, how to guide medical staff to deal with clinical research problems, and how to continuously improve the quality of clinical research needs clinical

researchers to explore further and understand the primary content and meaning of evidence-based nursing. Before the next implementation step, clinical medical staff should comprehensively consider the differences in humanistic customs, life background, medical service system, and patients' emotional attitudes according to the actual environment of our department and select the best evidence suitable for the patient's clinical situation. Remove obstacles and adverse factors, continue debugging, and perform a clinical intervention. Quality monitoring was carried out during the implementation process, and the results were compared and analyzed after the end to promote the effective transformation of evidence into clinical practice and benefit patients in the end.

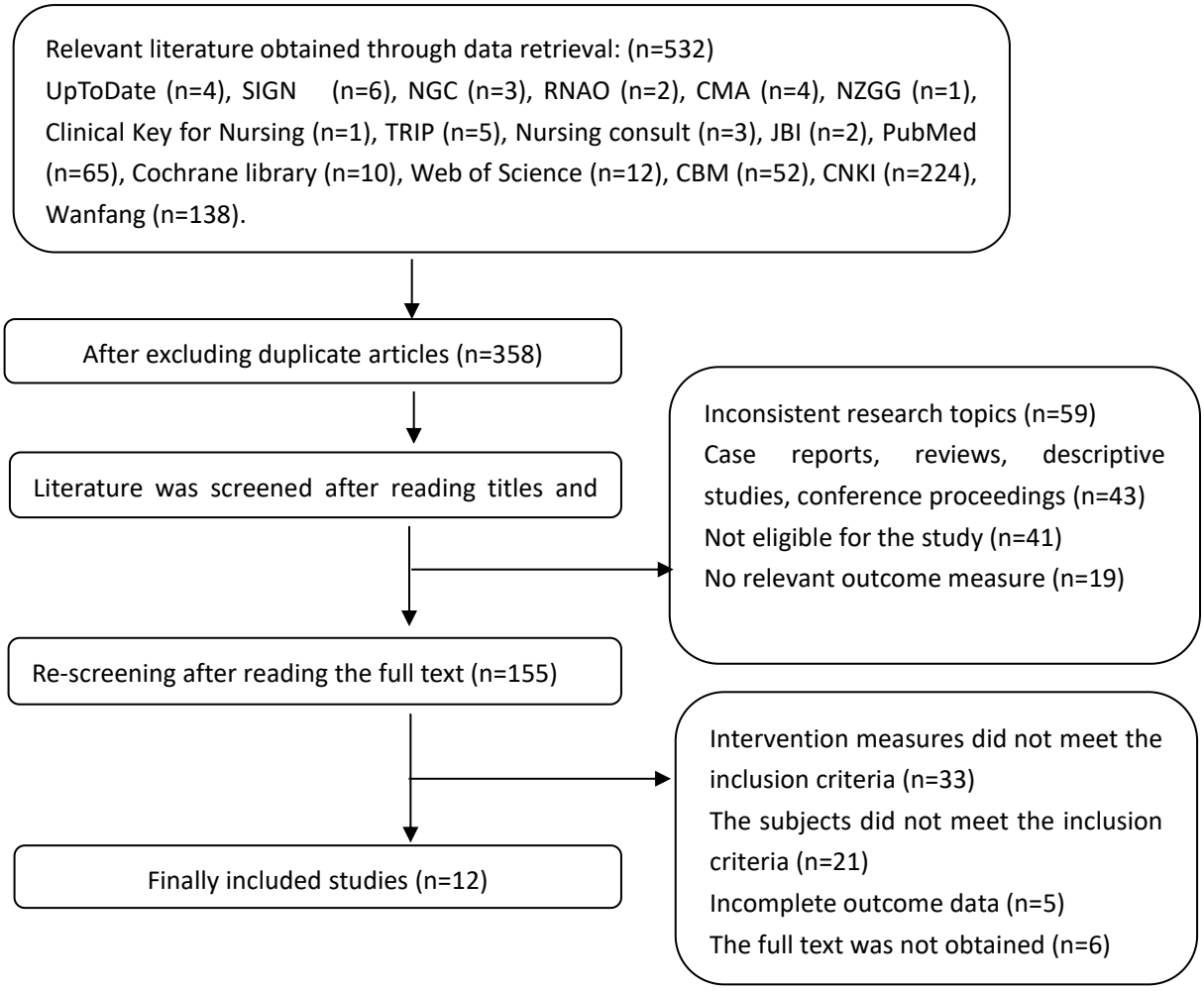

Figure 1. Literature screening flow chart.

Table 1. General information of the included literature

Author	Year	Literature sources	Literature classification	Recommendations related to research	Level of evidence
Tafler, K (17)	2022	SOGC	Practice Guidelines	1. All patients with gynaecological tumor surgery were assessed with standard DVT risk assessment such as Caprini score or Rogers score before surgery; 2. To prevent perioperative thrombosis, the use of intermittent pneumatic compression equipment is better than stretch stockings; 3. When the patient has a high risk of DVT with severe bleeding complications, multidisciplinary collaboration (doctors, nurses, anesthesiologists, etc.) is recommended; 4. Provide DVT risk counselling to patients undergoing gynecologic surgery. The discharge letter should include a description of the signs and symptoms of DVT and recommended treatment if DVT occurs.	IA
Farge, D (18)	2019	ITAC	Practice Guidelines	1. Anticoagulation and thrombosis prophylaxis according to tumor type; 2. Assessments should be performed regularly, at least every 48 hours; 3. DVT screening is recommended within 2-7 days after surgery.	IA
Nelson, G (19)	2019	UpToDate	Practice Guidelines	1. Dual prophylaxis for high-risk patients with an additional 28 days of prophylaxis.	IA
Bang, S. M (20)	2014	KSTH	Practice Guidelines	1. Mechanical prophylaxis for patients at intermediate risk if at risk of bleeding during anticoagulation therapy. 1 The elderly, frail and disabled depend on the Caprini score to prolong the duration of prophylaxis;	IA
Altman, A.D. (21)	2020	ERAS	Practice Guidelines	2. Choose the appropriate elastic stockings according to the clinician's judgment and the patient's condition; 3. Develop personalized health education for specific patient groups and update it in time; 4 Applying cluster nursing intervention to postoperative patients with gynaecological malignant tumours.	IB

Jorgensen, E (22)	2018	ACCP	Systematic review	1. The risk of thrombosis was stratified according to the operation time.	IIIA
Ma, S. G. (23)	2020	PubMed	Systematic review	1. Develop individualized thromboprophylaxis strategies according to patients' conditions.	IIIA
Corr, B. R (24)	2015	PubMed	Systematic review	1. Double prophylaxis (VTE mechanical and chemical prophylaxis) three times a day starting from 6 hours after surgery; 2. All perioperative patients with gynecologic tumours receive dual prophylaxis (mechanical prophylaxis and chemoprophylaxis).	IIIA
ACOG (25)	2018	ACOG	Expert consensus	1. Early postoperative ambulation (defined differently but often includes bedridden time as early as the day of surgery) is a mainstay of management. Ambulation can reduce thromboembolic complications, reduce insulin resistance and shorten the length of hospital stay.	IVA
Lang Jing he (26)	2017	Chinese Society of Obstetrics and Gynecology	Expert consensus	1. For postoperative patients with malignant tumors, low molecular weight heparin or low dose heparin is recommended for 4 weeks.	IVA
Gressel, G (27)	2021	Web of science	Expert consensus	1. The choice of anticoagulant for patients with gynecological cancer-associated VTE should be individualized.	IVA
Clarke-Pearson (28)	2012	ACOG	Expert consensus	1. Patients aged 60 years or older, with a history of cancer or venous thromboembolism, if both risk factors are present, need to add perioperative drug prophylaxis before surgery.	IVA

Table 2. Guideline Evaluation Table

Included Studies	Standardized percentages for each domain								
	Scope and Objective	People involved	Rigour	Clarity	Applicability	Independence	≥60%	≥30%	Level of recommendation
SOGC	100.00	77.78	87.50	100.00	79.17	58.00	6	6	A
ITAC	100.00	72.22	72.92	100.00	58.33	58.33	4	6	B

Nelson, G	88.89	88.89	91.67	94.44	79.17	91.67	6	6	A
ERAS	94.44	77.78	77.10	100.00	87.50	91.67	6	6	A
KSTH	88.89	83.33	79.17	100.00	70.83	75.00	6	6	A

Table 3. System evaluation table

Evaluation criteria	Jorgensen, E	Ma, S. G	Corr, B. R
1. Are the evidence-based questions raised clear and unambiguous?	YES	YES	YES
2. Are the inclusion criteria appropriate for this evidence-based question?	YES	YES	YES
3. Is the search strategy appropriate?	YES	YES	YES
4. Are the databases or resources searched adequate?	YES	YES	YES
5. Are the quality evaluation criteria used appropriate?	YES	YES	YES
6. Is the quality of the literature evaluated by two or more reviewers independently?	NO	YES	YES
7. Are certain measures taken to reduce errors during data extraction?	NO	YES	NO
8. Were the methods of the pooled studies appropriate?	YES	YES	YES
9. Was the potential for publication bias assessed?	YES	YES	YES
10. Are policy or practice recommendations based on systematic reviews?	YES	YES	NO
11. Are the proposed directions for further research appropriate?	YES	YES	YES

Table 4 Expert consensus evaluation table

Evaluation criteria	ACOG	Lang	Clarke-Pearson	Gressel, G
1. Is the literature source of the opinion clearly marked?	YES	YES	YES	YES
2. Are opinions derived from influential experts in the field?	YES	YES	YES	YES
3. Are the views presented centered on the interests of the population relevant to the study?	YES	YES	YES	YES
4. Are the stated conclusions based on the results of the analysis? Are the ideas expressed logically?	YES	YES	YES	YES
5. Did you refer to other existing literature?	YES	YES	YES	YES
6. Are there any inconsistencies between the ideas presented and the previous literature?	YES	YES	YES	YES

Table 5 Evidence content Table

First-level item	Second-level item	Third-level item	Recommendation level
1. Preoperative	1.1 Improving the screening rate of VTE risk in patients is the goal	1.1.1 Preoperative standard VTE risk assessment (Caprini or Rogers score)	IA
		1.1.2 Reassessment within 24 hours of admission or when the condition changes	IB
		1.1.3 VTE risk stratification of patients according to operation time	IIIA
		1.1.4 Develop individualized VTE prevention strategies according to patients' conditions	IIIA
	1.2 Improving nurses' knowledge, attitude and practice level of VTE is the goal	1.2.1 Departments should have standard VTE prevention guidelines	IA
		1.2.2 The department should establish a standardized VTE prevention medical team	IIIB
		1.2.3 Nurses should be trained in VTE knowledge and protection skills	IA
		1.2.4 Nurses should be assessed for VTE knowledge and protection skills	IA
2. Intraoperative	2.1 Improving nurses' compliance with intraoperative VTE protection behavior is the goal	2.1.1 Operating room nurses should evaluate the high risk factors of thrombosis in patients and understand their thrombosis in detail	IB
		2.1.2 When the head was low and the hip was high during the operation, the head was lowered 15°	IB
		2.1.3 During the operation, a soft pillow on the foot joint is conducive to venous blood reflux	IB
		2.1.4 Multidisciplinary collaboration should be carried out when there is a high risk of VTE combined with intraoperative bleeding	IA
3. Postoperative	3.1 Improving nurses' compliance with postoperative VTE protection behavior is the goal	3.1.1 DVT screening was performed within 2-7 days after surgery	IB
		3.1.2 Both mechanical and chemical prophylaxis was performed 6 hours after operation, 3 times a day	IA
		3.1.3 Nurses measured leg circumference and leg temperature in every shift to timely monitor the progress of the disease	IB
		3.1.4 Patients with high risk of VTE and bleeding should be treated with intermittent pneumatic compression devices and graded pressure socks for an extended 4-week prophylaxis period	IA
	3.2 Improving	3.2.1 Inform patients and their families of the signs and symptoms of VTE	IA

	3.2.2 Patients were encouraged to get off the ground as soon as possible (within 24 hours) after surgery	IA
the knowledge-attitude-practice level of VTE in patients and their family members is the goal	3.2.3 Intermittent pneumatic compression device was used after operation	IA
	3.2.4 The family members were instructed to perform passive ankle pump exercise to the patient within 6 hours after operation, and to guide the patient to perform active ankle pump exercise after 6 hours	IB
	3.2.5 The discharge notification should include the recommended treatment plan when VTE occurs	IA

Declarations

1) ***Consent to publication***
We declare that all authors agreed to publish the manuscript in this journal based on the signed Copyright Transfer Agreement and followed publication ethics.

2) ***Ethical approval and consent from participants***
Not applicable.

3) ***Disclosure of conflict of interests***
We declare that no conflict of interest exists.

4) ***Funding***
None

5) ***Availability of data and material***
We declare that the data supporting the results reported in the article are available in the published article.

6) ***Authors Contributions***
Authors contributed to this paper with the design (DDZ, DD and YQC), literature search (DD and DDZ), drafting (DDZ), revision (DDZ, DD and YQC), and editing (DDZ) and final approval (DDZ, DD and YQC).

7) ***Acknowledgement***
None.

8) ***Authors biography***
None.

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