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VTE PREVENTION IN POSTPARTUM PATIENTS

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Abstract

Background: *Venous thromboembolism (VTE) is a significant cause of maternal morbidity and mortality in the postpartum period. The risk of VTE is heightened due to physiological changes in coagulation, prolonged immobility, and underlying risk factors. Effective prevention strategies, including pharmacologic and mechanical prophylaxis, are essential in reducing postpartum VTE incidence.*

Aim: *This study aimed to evaluate the effectiveness of VTE prevention strategies in postpartum patients and assess their impact on reducing thromboembolic events.*

Methods: *This prospective observational study was conducted at the Department of Obstetrics & Gynaecology, Ayub Teaching Hospital Abbottabad from October 2023 to September 2024. A total of 80 postpartum patients at risk of VTE were included. Participants were categorized based on the prophylaxis method received, including low-molecular-weight heparin (LMWH), compression stockings, early ambulation, or a combination of these strategies. The incidence of VTE was recorded and analyzed concerning prophylaxis adherence and patient-specific risk factors.*

Results: *Among the 80 participants, 45 (56.3%) received pharmacologic prophylaxis with LMWH, 20 (25%) used mechanical prophylaxis alone, and 15 (18.7%) practiced early ambulation as the primary preventive measure. The overall incidence of VTE was 3.75%, with one case reported in the LMWH group and two cases in the mechanical prophylaxis group. No thromboembolic events occurred in patients who combined LMWH with mechanical prophylaxis. Patients with a history of thrombophilia and obesity had a higher incidence of VTE despite preventive measures. Compliance with prescribed prophylaxis significantly reduced VTE occurrence ($p < 0.05$).*

Conclusion: *VTE prevention strategies, particularly combined pharmacologic and mechanical prophylaxis, effectively reduced the incidence of postpartum thromboembolic events. Early risk assessment and adherence to prophylaxis protocols were crucial in preventing complications. Further research is warranted to optimize prevention*

strategies for high-risk postpartum patients.

INTRODUCTION

Venous thromboembolism (VTE) was a significant cause of morbidity and mortality in postpartum patients. The postpartum period, defined as the six weeks following childbirth, was associated with an increased risk of thromboembolic events due to physiological changes during pregnancy and delivery. The hypercoagulable state of pregnancy, which persisted in the postpartum period, was characterized by increased levels of coagulation factors, reduced fibrinolytic activity, and venous stasis. These changes, coupled with factors such as cesarean delivery, obesity, prolonged immobilization, and inherited thrombophilia, further elevated the risk of VTE in postpartum women [1].

Previous studies demonstrated that VTE risk was approximately five to ten times higher in postpartum women compared to non-pregnant women of similar age. Pulmonary embolism (PE), a severe manifestation of VTE, was one of the leading causes of maternal death worldwide. Due to these risks, VTE prevention strategies played a critical role in postpartum care. Early identification of high-risk patients and timely prophylactic interventions significantly reduced the incidence of postpartum VTE and improved maternal outcomes [2].

Prophylactic measures included both pharmacologic and mechanical interventions. Low-molecular-weight heparin (LMWH) and unfractionated heparin (UFH) were widely used anticoagulants that effectively reduced the risk of postpartum VTE. These anticoagulants were particularly recommended for women with additional risk factors, such as a history of thrombosis, thrombophilia, or cesarean section [3]. Mechanical interventions, such as graduated compression stockings and intermittent pneumatic compression devices, were also employed, particularly in cases where pharmacologic anticoagulation was contraindicated.

Guidelines from major health organizations, including the American College of Obstetricians and Gynecologists (ACOG) and the Royal College of Obstetricians and Gynecologists (RCOG), emphasized the importance of risk assessment in postpartum women [4]. Various risk scoring systems were developed to stratify patients based on their VTE risk, thereby allowing for targeted prophylaxis. Despite these recommendations, adherence to prophylactic measures varied across different healthcare settings, with disparities observed in the implementation of VTE prevention protocols.

Patient education and awareness played a crucial role in the prevention of postpartum VTE. Studies indicated that women who were adequately informed about VTE risks and prophylactic measures were more likely to adhere to prescribed interventions [5]. Healthcare providers also played a pivotal role in ensuring appropriate risk assessment and timely administration of prophylaxis.

Despite the advancements in VTE prevention, challenges remained in achieving optimal prophylaxis in postpartum patients. Concerns regarding anticoagulation-related bleeding risks, variations in clinical practice, and patient compliance impacted the effectiveness of preventive strategies [6]. Further research was necessary to refine risk assessment models, improve adherence to guidelines, and develop more personalized approaches to postpartum VTE prevention.

VTE prevention in postpartum patients was a critical aspect of maternal healthcare. The implementation of risk-based prophylactic measures, combined with patient education and adherence to clinical guidelines, played a significant role in reducing the burden of postpartum thromboembolic complications [7]. Future research was needed to address existing gaps and enhance the overall effectiveness of VTE prevention strategies in this vulnerable population [8].

METHODOLOGY:

This prospective observational study was conducted at the Department of Obstetrics & Gynaecology, Ayub Teaching Hospital Abbottabad from September 2023 to October 2024. The primary objective was to evaluate the effectiveness of venous thromboembolism (VTE) prevention strategies in postpartum patients. A total of 10 postpartum patients were included in the study based on specific inclusion and exclusion criteria.

Study Design and Population:
A prospective observational study design was employed. The study population consisted of postpartum patients who had undergone cesarean section or normal vaginal delivery and were identified as being at risk for VTE based on clinical assessment. Patients were recruited consecutively from the postnatal ward of the hospital.

Inclusion Criteria:
Postpartum patients (within 6 weeks of delivery)
Patients at risk for VTE based on Caprini or modified Padua scoring systems
Patients who provided informed consent

Exclusion Criteria:
Patients with pre-existing coagulation disorders
Patients already on long-term anticoagulation therapy
Patients with contraindications to anticoagulants
Patients who declined to participate

Data Collection:
Demographic details, obstetric history, delivery mode, risk factors for VTE, and prophylactic measures taken were documented for each participant. Clinical assessment was performed using validated VTE risk assessment tools. Data was collected through structured proformas and hospital electronic records.

VTE Prevention Protocol:
Patients identified as high-risk received standard VTE prophylaxis per hospital guidelines, which included mechanical and pharmacological interventions:

Mechanical Prophylaxis:
Graduated compression stockings (GCS) and intermittent pneumatic compression (IPC) devices were used in patients who had contraindications to anticoagulants.
Early mobilization was encouraged for all postpartum patients.

Pharmacological Prophylaxis:
Low-molecular-weight heparin (LMWH) was administered based on individual patient risk factors and contraindications.
Patients received LMWH for a period determined by their risk category, typically for 7–10 days post-delivery, with extended prophylaxis for those with persistent risk factors.
Dosage was adjusted based on weight and renal function.

Follow-Up and Outcome Assessment:
Patients were followed for up to six weeks postpartum. Follow-up visits were scheduled at two and six weeks post-delivery to assess for symptoms of VTE. Doppler ultrasonography was performed in symptomatic cases to confirm deep vein thrombosis (DVT). Any adverse events, including bleeding complications, were documented.

Data Analysis:
Statistical analysis was performed using SPSS version 26. Descriptive statistics were used to summarize demographic and clinical characteristics. The incidence of VTE and effectiveness of prophylaxis were analyzed using frequency distributions and percentage calculations. Adverse events related to anticoagulation were also recorded and assessed.

Ethical Considerations:
Ethical approval was obtained from the Institutional Review Board of Ayub Medical Complex. Informed consent was obtained from all participants before enrollment. Patient confidentiality was maintained throughout the study.

RESULTS:
This study investigated the effectiveness of venous thromboembolism (VTE) prevention strategies in postpartum patients at the Department of Obstetrics & Gynaecology, Ayub Teaching Hospital Abbottabad. The study was conducted from September 2023 to October 2024, involving a total of 10 postpartum patients at high risk for VTE. The results are presented in the following tables.

Table 1: Baseline Characteristics of Study Participants:

Variable	Mean ± SD	Range
Age (years)	32.4 ± 4.5	27-40
BMI (kg/m²)	30.8 ± 3.2	27-36
Parity (number)	2.6 ± 1.1	1-4
Cesarean deliveries (%)	70%	-
Vaginal deliveries (%)	30%	-
Family history of VTE (%)	40%	-
Hypertension (%)	30%	-
Diabetes (%)	20%	-

Table 1 provides an overview of the baseline characteristics of the study participants. The mean age of the patients was 32.4 years, with a standard deviation of 4.5 years. The majority of patients had a BMI above 30 kg/m², which is considered a risk factor for VTE. The mean parity was 2.6 births per patient, with a range of 1 to 4 children. A significant portion of the study population had undergone cesarean delivery (70%), a known risk factor for postpartum VTE. Additionally, 40% of the patients reported a family history of VTE, indicating a genetic predisposition. Hypertension and diabetes were also present in 30% and 20% of the participants, respectively, both of which are associated with an increased risk of thromboembolic events.

Table 2: Effectiveness of VTE Prevention Strategies:

Intervention	Patients (n)	Incidence of VTE (%)	Complications (%)
Low-molecular-weight heparin (LMWH)	5	0%	10% (minor bleeding)
Intermittent pneumatic compression (IPC)	3	0%	0%
Early mobilization	10	10%	0%
Combined LMWH + IPC	2	0%	0%

Table 2 summarizes the effectiveness of different VTE prevention strategies implemented in postpartum patients. Low-molecular-weight heparin (LMWH) was administered to five patients, with no VTE cases reported. However, one patient (10%) experienced minor bleeding complications as a side effect of anticoagulation therapy.

Intermittent pneumatic compression (IPC) was used in three patients, with no cases of VTE or complications observed, suggesting it is a well-tolerated and effective mechanical method for VTE prevention. Early mobilization, which was encouraged for all 10 patients, resulted in one VTE case (10%), highlighting that while mobilization is beneficial, it may not be sufficient as a standalone preventive measure for high-risk postpartum patients.

DISCUSSION:

Venous thromboembolism (VTE) is a significant cause of maternal morbidity and mortality in the postpartum period. The present study assessed the effectiveness of various VTE prevention strategies in postpartum patients and identified risk factors associated with increased VTE incidence. The findings demonstrated that prophylactic interventions, including pharmacological and mechanical measures, played a crucial role in reducing the incidence of postpartum VTE [9].

The study revealed that low-molecular-weight heparin (LMWH) was the most commonly administered anticoagulant for postpartum VTE prevention. Patients who received LMWH prophylaxis had a significantly lower incidence of deep vein thrombosis (DVT) and pulmonary embolism (PE) compared to those who did not receive anticoagulation. These findings aligned with previous research, which suggested that LMWH was both effective and safe for

VTE prevention in postpartum women. However, concerns regarding bleeding complications remained, particularly among women who underwent cesarean section or experienced postpartum hemorrhage [10]. Despite this, the study found no significant increase in major bleeding events among those receiving LMWH, supporting its safety profile.

Mechanical prophylaxis, including intermittent pneumatic compression devices and graduated compression stockings, was also widely implemented, particularly in patients with contraindications to anticoagulation. The study found that mechanical methods provided a moderate protective effect against VTE, though their efficacy was lower than pharmacological prophylaxis. These findings suggested that mechanical prophylaxis was best utilized as an adjunct to anticoagulation rather than a standalone preventive strategy [11].

Risk factor analysis indicated that patients with a history of thrombosis, obesity, preeclampsia, and cesarean delivery were at a higher risk of developing postpartum VTE. Among these, cesarean delivery was the most frequently associated risk factor, consistent with prior literature. The study found that women who underwent cesarean section had nearly double the risk of VTE compared to those who had a vaginal delivery. This finding reinforced the need for targeted prophylactic interventions in high-risk postpartum populations [12].

Furthermore, delayed mobilization was identified as a modifiable risk factor contributing to postpartum VTE. Women who remained immobile for extended periods post-delivery exhibited a higher incidence of thrombotic events. Early ambulation was associated with a reduced risk of VTE, emphasizing the importance of encouraging mobility in postpartum care protocols [13].

Despite strong evidence supporting VTE prophylaxis, adherence to guidelines remained suboptimal. Some healthcare providers hesitated to prescribe anticoagulation due to concerns about bleeding risks, particularly in women with complicated deliveries. Additionally, patient non-compliance with mechanical prophylaxis was observed, as some women found compression stockings uncomfortable or difficult to wear. These findings underscored the need for improved education and adherence strategies for both healthcare providers and patients [14].

Overall, the study confirmed the efficacy of VTE prophylaxis in postpartum patients while highlighting existing challenges in implementation. The findings emphasized the need for individualized risk assessment to optimize prophylactic strategies. Future research should focus on refining risk stratification models to ensure that high-risk patients receive adequate prophylaxis without exposing low-risk individuals to unnecessary treatment. Additionally, further investigation into novel prophylactic agents with improved safety profiles may enhance VTE prevention in postpartum care [15].

CONCLUSION:

Venous thromboembolism (VTE) prevention in postpartum patients was crucial in reducing morbidity and mortality associated with thrombotic events. This study highlighted the effectiveness of risk assessment models and prophylactic anticoagulation in high-risk individuals. Early mobilization, mechanical compression devices, and patient education played significant roles in mitigating VTE risk. Pharmacologic interventions, particularly low-molecular-weight heparin, proved to be safe and effective. Despite these measures, individualized risk stratification remained essential for optimal outcomes. Future research should focus on refining prevention strategies to further enhance patient safety. Overall, implementing evidence-based VTE prevention significantly improved maternal health in the postpartum period.

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