# Guidance for Management of Peripartum VTE Prophylaxis

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This document serves to assist in the approach to management. Each case must be handled on an individual basis, and should be replaced by clinical judgment when necessary.

**Background:** Women who are pregnant or in the postpartum period have a four- to fivefold increased risk of thromboembolism compared with non-pregnant women. Venous thromboembolism (VTE) is one of the leading causes of maternal mortality in the United States, accounting for 9.3% of all maternal deaths.[1] The prevalence and severity of this condition warrants special consideration of those at increased risk.[1] This document summarizes VTE prophylaxis recommendations in pregnancy, based upon the most up to date guidelines and resources. As there is some variance between guidelines regarding antepartum and postpartum management, the below summary is an attempt by the authors to create a consensus document for practical clinical use.

## TABLE 1 – Indications for *antepartum* VTE PROPHYLAXIS^

| |
|---|
| History of single unprovoked VTE[1-3] |
| History of VTE associated with pregnancy or other hormonal risk factor[1-3] |
| Low risk thrombophilia# plus ≥1 of the following:[2]<br>a. single VTE<br>b. family history of VTE in first degree relative |
| High risk thrombophilia+ plus ≥1 of the following:[2]<br>a. no history of VTE<br>b. single VTE<br>c. family history of VTE in first degree relative[3] |
| History of 2 or more episodes of VTE and NOT on long term anticoagulation (should receive intermediate or treatment dosing antepartum)[2] |
| Immobilization with pre-pregnancy BMI of ≥25 kg/m$^2$ or ≤25 kg/m$^2$ with significant comorbidity (SLE, sickle cell, heart disease)[3] |
| Women undergoing assisted reproductive therapy who develop severe ovarian hyperstimulation syndrome[1] |

^ The above indications apply to patients NOT receiving long-term (treatment dose) anticoagulation therapy at presentation[2]
# Low-risk thrombophilias: factor V Leiden heterozygosity; prothrombin G20210A mutation heterozygosity; protein C or protein S deficiency; antiphospholipid antibody[2]
+ High-risk thrombophilias: factor V Leiden homozygosity; prothrombin G20210A mutation homozygosity; factor V Leiden heterozygosity and concurrent prothrombin G20210A mutation; antithrombin deficiency[2]

## TABLE 2 – Anticoagulant dosing regimens for *antepartum* VTE PROPHYLAXIS

| | |
|---|---|
| **Prophylactic LMWH^#+** | Enoxaparin 40 mg SC once daily (preferred agent)[2,3] |
| **Intermediate-dose LMWH+** | Enoxaparin 40 mg SC Q12h<br>(dose adjusted to peak anti-Xa level of 0.2–0.6 units/mL)[2,3] |
| **Prophylactic UFH#+** | 1st trimester:<br>UFH 5,000–7,500 units SC every 12 hrs.[2]<br>2nd trimester:<br>UFH 7,500–10,000 units SC every 12 hrs.[2]<br>3rd trimester:<br>UFH 10,000 units SC every 12 hrs.<br>(if aPTT elevation suspected, consider monitoring aPTT while utilizing higher dose UFH regimen)[2] |

^ At extremes of body weight, dose modification may be required
# No routine monitoring required (optimal anti-Xa levels for prophylaxis in pregnancy have not been determined
+ Obtaining platelet counts at the initiation of AC when the risk of HIT is >1% is recommended
**In most instances, warfarin and DOACs should NOT be used during pregnancy**

## TABLE 3 – Time to discontinuation of prophylactic anticoagulation *prior to delivery*

| | |
|---|---|
| **LMWH^** | Low dose (40mg daily or 30mg Q12h): 12 hrs.[1-4]<br>Intermediate dose (40mg SC Q12h): 24 hrs.[2,4] |
| **SC UFH^#+** | Low dose (5,000 units/dose; total daily dose ≤10,000 units): 4–6 hrs.[4]<br>Intermediate dose (7,500 units – 10,000 units/dose; total daily dose >10,000 – 20,000 units): 12 hrs.[2,4]<br>High dose (>10,000 units/dose; total daily dose >20,000 units): 24 hrs.[2,4] |

^ For those who do not have a planned delivery, advise patient to discontinue anticoagulant at first signs of labor
# Assess coagulation status and CBC before administering neuraxial anesthesia
+ Protamine sulfate can be used to reverse therapeutic doses of UFH in emergent cases, but is NOT indicated for prophylactic doses

Abbreviations: VTE (venous thromboembolism); LMWH (low molecular weight heparin); SC (subcutaneous); UFH (unfractionated heparin); DOAC (direct-acting oral anticoagulant, e.g. apixaban, betrixaban, dabigatran, edoxaban, rivaroxaban)



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## TABLE 4 – Optimal time to resumption of *postpartum* prophylactic anticoagulation

| | |
|---|---|
| **LMWH^** | Vaginal delivery: no sooner than 4-6 hrs. post-delivery[2,3]<br>Cesarean delivery: no sooner than 6-12 hrs. post-delivery[2,3]<br>Neuraxial blockade/catheter removal: No sooner than 12 hrs. after neuraxial blockade or 4 hrs. after catheter removal (whichever is longer)[2,4] |
| **UFH (SC)^** | Vaginal delivery: no sooner than 4-6 hrs. post-delivery[2]<br>Cesarean delivery: no sooner than 6-12 hrs. post-delivery[2]<br>Neuraxial blockade/catheter removal: No sooner than 1 hr. after neuraxial blockade or 4 hrs. after catheter removal (whichever is longer)[2,4] |

^ Depending on postpartum hemostasis and the indication for the anticoagulant, anticoagulation can be restarted 12 to 24 hrs. postpartum, assuming hemostasis has been achieved and no hemorrhage

## TABLE 5 – Indications for *postpartum* VTE PROPHYLAXIS^

| |
|---|
| Any patient who is receiving or qualifies for antepartum pharmacologic VTE prophylaxis[#,1] (refer to Table 1) |
| History of VTE and NOT currently on long-term (treatment dose) anticoagulation[1] |
| Antepartum immobilization ≥7 days and immobilized postpartum, with known thrombophilia or significant medical comorbidity[+,3] |
| Cesarean delivery with ≥1 risk factor[$] or ≥2 (or ≥1 with emergency cesarean) medical conditions[@,3] |

^ Applies to patients NOT receiving long-term (treatment dose) anticoagulation at presentation; if on long term (treatment dose) anticoagulation antepartum, resume same dose postpartum[2]
# If patient received intermediate or treatment dose anticoagulation antepartum, resume same dose postpartum
+ Significant medical comorbidities: systemic lupus erythematosus; heart disease; sickle cell disease[3]
$ Risk factors: prior VTE; antepartum immobilization; postpartum infection; postpartum hemorrhage; pre-eclampsia with growth restriction; significant medical comorbidities[$]; known thrombophilia[3]
@ Medical conditions: postpartum hemorrhage; BMI > 30 kg/m$^2$; fetal growth restriction; pre-eclampsia; multiple pregnancy; tobacco use during pregnancy[3]

## TABLE 6 – Anticoagulant dosing regimens for *postpartum* VTE PROPHYLAXIS

| | |
|---|---|
| **Prophylactic LMWH^#+** | Enoxaparin 40 mg SC once daily[1-3] |
| **Warfarin** | Women who require ≥ 6 weeks of postpartum AC may be bridged to warfarin (with LMWH or UFH) until INR is therapeutic[$2,3] |

^ At extremes of body weight, dose modification may be required
# No routine monitoring required (optimal anti-Xa levels for prophylaxis in pregnancy have not been determined)
+ Obtaining platelet counts at the initiation of AC when the risk of HIT is >1% is recommended
$ Use of warfarin is limited in this setting unless continuing onto long term therapy, as it frequently requires 1-2 weeks of administration until goal INR is achieved

## TABLE 7 – Anticoagulation compatibility with breastfeeding

| | |
|---|---|
| **Compatible with breastfeeding** | LMWH, UFH, warfarin, fondaparinux[1-3] |
| **NOT compatible or not recommended with breastfeeding** | DOACs (apixaban, betrixaban, dabigatran, edoxaban, rivaroxaban)[1-3] |


**References:**
**1.** Bates, S. M., Rajasekhar, A., Middeldorp, et al. American Society of Hematology 2018 guidelines for management of venous thromboembolism: venous thromboembolism in the context of pregnancy. Blood Advances 2018;2,3317-3359.
**2.** James A, Birsner M, Kaimal A. ACOG Practice Bulletin No. 196: Thromboembolism in Pregnancy. Obstetrics & Gynecology 2018;132:e1-e17.
**3.** Bates SM, Middeldorp S, Rodger M, et al. Guidance for the treatment and prevention of obstetric-associated venous thromboembolism. J Thromb Thrombolysis 2016;41:92-128.
**4.** Leffert L, et al. The Society for Obstetric Anesthesia and Perinatology Consensus Statement on the Anesthetic Management of Pregnant and Postpartum Women Receiving Thromboprophylaxis or Higher Dose Anticoagulants Anesth Analg 2018;126:928-944.


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