Guidance for Management of Acute VTE During Pregnancy

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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: While LMWH is considered the drug of choice for prophylaxis and treatment of pregnancy-associated VTE, UFH may be used as an alternative and remains the preferred agent in patients with significant renal dysfunction (CrCl < 30 ml/min), who require rapid reversal, at extremes of body weight, or when LMWH is unavailable or cost-prohibitive. This document summarizes the pharmacological management of VTE with LMWH & UFH during pregnancy, based upon the most up to date guidelines and expert resources.

Table 1. Anticoagulant dosing regimens for VTE TREATMENT during pregnancy

LMWH [a,b] (Preferred)	Enoxaparin 1 mg/kg SC Q12h[1,2,3] (reserve 1.5 mg/kg SC daily for patients who are resistant to more frequent injections) Dalteparin 200 units/kg SC once daily or 100 units/kg Q12h[1,2] Nadroparin 86 units/kg SC Q12h or 171 units/kg once daily[2] Tinzaparin 175 unis/kg SC once daily[1,2]
UFH [a,b]	**Option 1**: 333 units/kg **SC** bolus (omit if previously therapeutically anticoagulated), then 250 units/kg **SC** Q12h fixed dosing, titrated to achieve a mid-interval anti-Xa (0.3 – 0.7 units/ml) in the therapeutic range [c,d,e,4] **Option 2**: 80 units/kg **IV** bolus, then 18 units/kg/h **IV** per local heparin protocol, titrated to therapeutic anti-Xa or aPTT x5 days; after 5 days of IV therapy, convert total current daily dose into BID – TID **SC** dosing, titrated to achieve a mid-interval anti-Xa (0.3 – 0.7 u/ml) in the therapeutic range [e,4,5]

[a] LMWH is preferred due to increased potential of adverse effects with UFH
[b] UFH is preferred when urgent reversal is needed (e.g. impending delivery), or in patients who are obese [>150kg] or have a CrCl <30 ml/min
[c] Do not use for treatment of arterial thrombosis
[d] If LMWH is used initially, consider transitioning to UFH at 36-37 weeks gestation to minimize risk of epidural or spinal hematoma with neuraxial anesthesia [2,5]
(administer first dose of UFH 10 – 12 hours after last dose of LMWH given)
[e] If anti-Xa monitoring is not available, then mid-interval aPTT of 1.5-2.5 x control may be utilized
****AVOID** use of warfarin and DOACs (oral direct thrombin inhibitors and factor Xa inhibitors) during pregnancy**
For patients with a history of HIT, fondaparinux is the preferred agent
Thrombolytic therapy is best reserved for life threatening VTE (hemodynamic instability)

Table 2. Time to discontinuation of therapeutic anticoagulation prior to delivery

LMWH	24 hours prior to planned delivery and neuraxial blockade [f,1,2,6]
SC UFH	24 hours prior to planned delivery and assess coagulation status and CBC before administering neuraxial anesthesia [f,g,1,2,7]
IV UFH	4-6 hours prior to planned delivery and assess coagulation status and CBC before administering neuraxial anesthesia [f,g,h,2,3,6,8]

[f] For those who do not have a planned delivery, advise patient to discontinue anticoagulant at first signs of labor [1,3,5]
[g] Protamine sulfate can be used to reverse therapeutic doses of UFH in emergent cases, but is NOT indicated for prophylactic doses
[h] For highest risk patients, consider IV UFH to minimize time off anticoagulation (e.g. VTE within 2 weeks prior to delivery, or when urgent delivery/surgery is necessary)

Table 3. Optimal time to resumption of anticoagulation postpartum

LMWH[i]	Vaginal delivery: no sooner than 4-6 hours post-delivery[1] Cesarean delivery: no sooner than 6-12 hours post-delivery[1] Neuraxial blockade/catheter removal: No sooner than 24 hours after neuraxial blockade or 4 hours after catheter removal (whichever is longer) [1,3]
UFH[i] (SC and IV)	Vaginal delivery: no sooner than 4-6 hours post-delivery[1] Cesarean delivery: no sooner than 6-12 hours post-delivery[1] Neuraxial blockade/catheter removal: No sooner than 1 hour after neuraxial blockade or catheter removal (whichever is longer) [1,3]

[i] Depending on postpartum hemostasis and the indication for the anticoagulant, anticoagulation can be restarted 12 to 24 hours postpartum, assuming hemostasis has been achieved and no hemorrhage

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Abbreviations: VTE (venous thromboembolism); LMWH (low molecular weight heparin); SC (subcutaneous); UFH (unfractionated heparin)

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