

## **OVERVIEW**

Neuraxial labor analgesia provides pain relief for women in labor and may be used for operative delivery if required. Venous thromboembolism is one of the leading causes of maternal morbidity and mortality in the United States. The incidence of VTE was 29.8 per 100,000 vaginal deliveries in 2012. There has been an increased focus on administering pharmacologic prophylaxis to at-risk parturients. Women receiving anticoagulation antepartum, intrapartum, and post-partum present unique challenges to providing safe placement of neuraxial anesthesia due to increased risk of bleeding and possible epidural or spinal hematoma. However, general anesthesia for cesarean or other obstetric procedures is associated with increased risk of maternal and fetal adverse events compared to neuraxial anesthesia. Balancing these risks is important to providing the safest and most effective anesthetic to a parturient. This document covers the American Society of Regional Anesthesia (ASRA) and Society for Obstetric Anesthesia and Perinatology (SOAP) recommendations for evaluation and treatment of women on anticoagulation (prophylactic or therapeutic) who may desire or require neuraxial anesthesia. Individualized and tailored anesthetic plans are provided for each patient undergoing treatment at UNM and this document serves as a review of published guidelines.

## **AREAS OF RESPONSIBILITY**

Labor and Delivery

### **Antepartum Recommendations**

The most effective way to plan for a safe delivery of a woman receiving peri-partum anticoagulation is through multidisciplinary advanced discussion. Some women may benefit from a hematology consult to determine if thromboprophylaxis or high-dose anticoagulants should be held during labor and delivery.

The following UNM recommendations are in line with the SOAP consensus statement Anesthetic Management of Pregnant and Postpartum Women Receiving Thromboprophylaxis or Higher Dose Anticoagulants.

### **Antepartum Communication**

- Predelivery communication between the obstetric and anesthesia teams at 34 weeks for women receiving anticoagulation, or earlier if delivery is imminent. This consultation should be documented in the electronic medical record.
- Parturients on anticoagulation should be referred to the Pre-Op clinic for a phone or in-person consult by 34 weeks.
- Counsel parturient to hold anticoagulation if she suspects she is in labor, is having vaginal bleeding, or has rupture of membranes and call her obstetric provider.

### **Antepartum Medication Management**

- Consideration should be given to transition parturients to an anticoagulation regimen that facilitates neuraxial procedures in the 3<sup>rd</sup> trimester. This may mean transitioning from low molecular weight heparin to unfractionated heparin.
- For antepartum inpatients requiring thromboprophylaxis, use SCDs and low-dose unfractionated heparin- UFH (5,000 Units SQ BID). Consider avoiding low molecular weight heparin (LMWH) or higher dose UFH.
- For antepartum outpatients requiring thromboprophylaxis, consider switching to UFH 5,000 SQ BID at 36 weeks gestation or earlier in women at high risk of urgent cesarean or preterm labor.
- If LMWH is continued beyond 36 weeks, anticipate the need to hold dosing for 12 to 24 hours in preparation for labor or procedures depending on dosing.
- A platelet count is required prior to neuraxial anesthesia in any woman receiving UFH for greater than 4 days.

### **Intrapartum Recommendations**

The goal in the intrapartum period is to minimize the chance a pregnant woman has recently received thromboprophylaxis or high dose anticoagulants and desires labor epidural placement or requires a neuraxial anesthetic for operative procedure. A labor epidural is considered an ELECTIVE procedure and is not deemed Urgent or Emergent. A neuraxial anesthetic (Epidural, CSE, or Spinal) for an operative procedure may be considered Urgent or Emergent depending on the clinical context. Medication guidelines are summarized in Table 1.

### **Intrapartum Communication**

- Anticoagulation status and last dose of medication administration should be populated on QS Chalkboard on admission to L&D and written on the white board in the patient's room
- Review anticoagulation status of each parturient admitted to L&D at morning and evening sign-out
- Patients on anticoagulation should populate RED in the PPH risk factor dashboard
- An Anesthesia consult should be requested when patient arrives in L&D
- The anesthesia note will include allowable timing of neuraxial procedure, and timing of restarting anticoagulation after delivery

**Medication Management for Elective Obstetric Procedures** (Labor Epidural, Cerclage, Induction of labor, Planned Cesarean Delivery, External Cephalic Version, Postpartum Tubal Ligation)

#### ***Unfractionated Heparin (UFH)***

- Low Dose UFH (5,000 U SQ BID or TID)- Hold dose for 4-6 hours before placing neuraxial anesthesia or assessing coagulation status
- Intermediate Dose UFH (7,500 U SQ BID or 10,000 U SQ BID) – Hold dose for 12 hours before placing neuraxial anesthesia or assessing coagulation status
- High Dose UFH (Individual dose > 10,000 SQ or > 20,000 SQ in 24 hour period) – Hold dose for 24 hours before placing neuraxial anesthesia or assessing coagulation status
- IV Heparin - Hold dose for 4-6 hours before placing neuraxial anesthesia or assessing coagulation status

#### ***Low Molecular Weight Heparin (LMWH)***

- Low Dose LMWH (Enoxaparin  $\leq 40$  mg SQ Daily)- Hold dose for  $\geq 12$  hours before placing neuraxial anesthesia
- Intermediate Dose LMWH (Enoxaparin  $>40$ mg SQ Daily, 30mg SQ BID,  $< 1$ mg/kg SQ BID,  $< 1.5$ mg/kg SQ Daily)- Insufficient data to recommend between 12-24 hours.
- High Dose LMWH (Enoxaparin 1mg/kg SQ BID, 1.5mg/kg SQ Daily) – Hold dose for  $\geq 24$  hours before placing neuraxial anesthesia

### **Medication Management for Urgent and Emergent Obstetric Procedures** (Urgent/Emergent Cesarean section, D&C for Retained Placenta).

Counsel pregnant women to hold anticoagulation if she suspects she is in labor, is having vaginal bleeding, or has rupture of membranes and call her obstetric provider. Recommendations for holding dosing remains the same for UFH and LMWH prior to neuraxial procedures. However in the case of urgent/emergent cesarean delivery, a risk benefit analysis must be undertaken to evaluate the risk of general anesthesia (GA). Neuraxial block may still be considered in the time frame if risk of general anesthesia outweighs the benefit. See the published decision aids in Figure 1 and Figure 2

#### ***Unfractionated Heparin (UFH)***

- Low Dose UFH (5,000 U SQ BID or TID)- Hold dose for 4-6 hours. In urgent cases within this time frame consider sending an aPTT and consider placing neuraxial if aPTT is  $< 40$  or risk of general anesthesia is considered higher than risk of epidural hematoma.
- Intermediate Dose UFH (7,500 U SQ BID or 10,000 U SQ BID) – Hold dose for 12 hours. In urgent cases within this time frame consider sending an aPTT and consider placing neuraxial if aPTT is  $< 40$  or risk of general anesthesia is considered higher than risk of epidural hematoma.
- High Dose UFH (Individual dose  $> 10,000$  SQ or  $> 20,000$  SQ in 24 hour period) – Hold dose for 24 hours. . In urgent cases within this time frame consider sending an aPTT and consider placing neuraxial if aPTT is  $< 40$ . Proceed with General Anesthetic if unable to wait for aPTT results.

#### ***Low Molecular Weight Heparin (LMWH)***

- Low Dose LMWH (Enoxaparin  $\leq 40$  mg SQ Daily)- Hold dose for  $\geq 12$  hours before placing neuraxial anesthesia. Proceed with GA if  $< 12$  hours.
- Intermediate Dose LMWH (Enoxaparin  $>40$ mg SQ Daily, 30mg SQ BID,  $< 1$ mg/kg SQ BID,  $< 1.5$ mg/kg SQ Daily)- Insufficient data to recommend between 12-24 hours. Proceed with GA if  $< 12$  hours.
- High Dose LMWH (Enoxaparin 1mg/kg SQ BID, 1.5mg/kg SQ Daily) – Hold dose for  $\geq 24$  hours before placing neuraxial anesthesia. Proceed with GA if  $< 24$  hours.

### **Post-Partum Recommendations**

- The bedside nurse should contact the anesthesia team prior to pulling an epidural if the patient has received anticoagulation (UFH) during labor
- Recommendations for the timing of re-starting anticoagulation on parturients post partum will be written in the anesthesia note

- For patient that were on LMWH ante-partum, consider a short bridge with UFH post partum to be able to initiate anticoagulation sooner.
- Discuss with the anesthesia team if the patient has a planned postpartum surgical procedure (tubal ligation, epidural blood patch) to discuss timing of thromboprophylaxis.
- Bedside nurse should include appropriate timing of anticoagulation during the signout/transfer of the patient to postpartum.

#### ***Unfractionated Heparin (UFH)***

- Low Dose UFH (5,000 U SQ BID or TID)- Wait at least 1 hour after neuraxial procedure and 1 hour after epidural catheter removal to restart thromboprophylaxis. Catheter removal should occur > 4-6 hours after dose of UFH.
- IV UFH- Wait at least 1 hour after neuraxial procedure and 1 hour after epidural catheter removal to restart thromboprophylaxis. Catheter removal should occur > 4-6 hours after discontinuing IV UFH

#### ***Low Molecular Weight Heparin (LMWH)***

- Low Dose LMWH (Enoxaparin  $\leq 40$  mg SQ Daily)- Wait > 12 hours after neuraxial procedure and 4 hours after epidural catheter removal to restart LMWH thromboprophylaxis
- Intermediate Dose LMWH (Enoxaparin >40mg SQ Daily, 30mg SQ BID, < 1mg/kg SQ BID, < 1.5mg/kg SQ Daily) & High Dose LMWH (Enoxaparin 1mg/kg SQ BID, 1.5mg/kg SQ Daily) – Wait > 24 hours after neuraxial procedure and 4 hours after epidural catheter removal to restart LMWH.

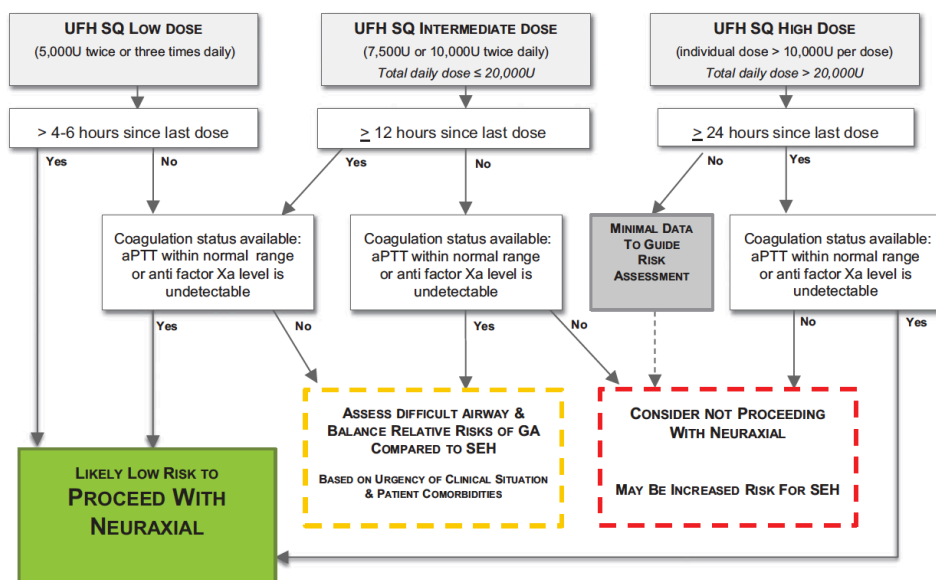
This document provides recommendations of management of anticoagulation and thromboprophylaxis in the ante-partum, intrapartum, and postpartum time frame. Care should be taken to tailor the anesthetic plan to the particular needs of the patients weighing risks and benefits.

**Table 1: UNM Anticoagulation Guidelines for Neuraxial procedures in obstetric patients**

## UNM- Anticoagulation Guidelines for Neuraxial Procedures in Obstetric Patients

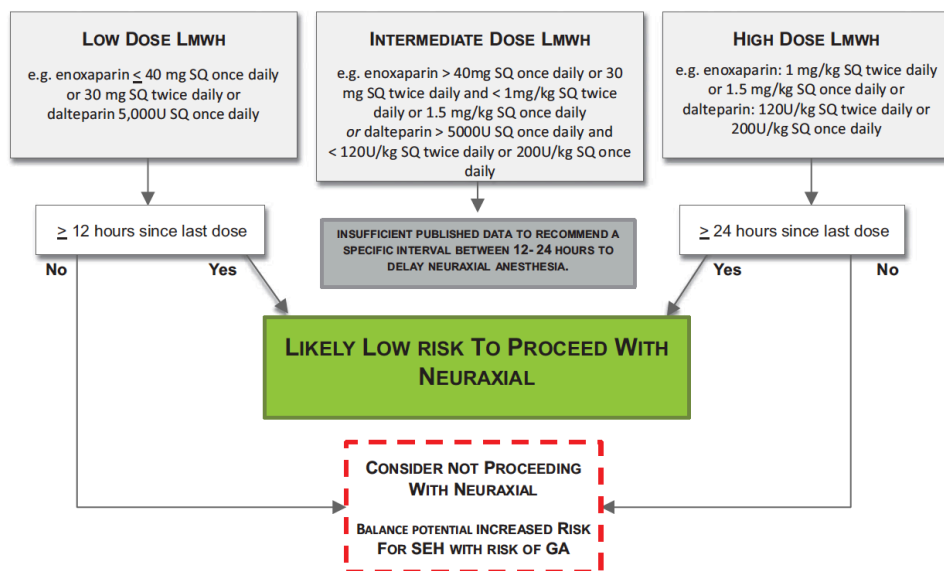
	Minimum time between last dose of anticoagulant & spinal or epidural placement	Use of Anticoagulant agents with indwelling epidural	Minimum time between dose of anticoagulant & catheter removal	Minimum time between spinal injection/epidural placement or catheter removal & next dose of anticoagulant
Warfarin	INR < 1.5	CONTRAINDICATED	N/A	2 Hours
Heparin Full Dose IV	Stop for 4-6hrs aPTT < 40	OK	4-6 Hours	1 Hour
Heparin 5000 Units SQ BID	4-6 Hours	OK	4-6 Hours	1 Hour
Heparin 5,000 Units SQ TID	4-6 Hours	OK	4-6 Hours	1 Hour
Heparin 7,500- 10,000 Units SQ BID	12 Hours	CONTRAINDICATED	N/A	1 Hour
Heparin dose > 10,000 Unit SQ OR Heparin > 20,000 Units SQ Daily	24 Hours aPTT < 40	CONTRAINDICATED	N/A	1 Hour
Enoxaparin (Lovenox) (Low) ≤ 40mg SQ Once Daily	12 Hours	CONTRAINDICATED	N/A	12 hours after Epidural/Spinal Placed  AND  4 Hours after Epidural removal
Enoxaparin (Lovenox) (Intermediate) > 40mg SQ Once Daily 30mg SQ BID < 1mg/kg SQ BID < 1.5mg/kg SQ Once daily	12-24 Hours* *Insufficient evidence for specific interval	CONTRAINDICATED	N/A	24 hours after Epidural/Spinal Placed  AND  4 Hours after Epidural removal
Enoxaparin (Lovenox) (High) 1 mg/kg SQ BID 1.5 mg/kg SQ Once Daily	24 Hours	CONTRAINDICATED	N/A	24 hours after Epidural/Spinal Placed  AND  4 Hours after Epidural removal

**Figure 1: Decision Aid for URGENT or EMERGENT Neuraxial Procedures in obstetric patients Receiving Unfractionated Heparin (UFH)**



**Figure 3.** Decision aid for urgent or emergent neuraxial procedures in the obstetric patient receiving UFH. \*Assume normal renal function, body weight > 40 kg, and no other contraindications to neuraxial anesthesia. aPTT indicates activated partial thromboplastin time; GA, general anesthesia; SEH, spinal epidural hematoma; SQ, subcutaneous; UFH, unfractionated heparin. Note: This SOAP consensus statement is not intended to set out a legal standard of care and does not replace medical care or the judgment of the responsible medical professional considering all the circumstances presented by an individual patient.

**Figure 2: Decision aid for URGENT or EMERGENT neuraxial procedure in obstetric patients receiving low molecular weight heparin (LMWH)**



**Figure 4.** Decision aid for urgent or emergent neuraxial procedures in the obstetric patient receiving LMWH. \*Assume normal renal function, body weight >40 kg, and no other contraindications to neuraxial anesthesia. GA indicates general anesthesia; LMWH, low molecular weight heparin; SEH, spinal epidural hematoma; SQ, subcutaneous. Note: This SOAP consensus statement is not intended to set out a legal standard of care and does not replace medical care or the judgment of the responsible medical professional considering all the circumstances presented by an individual patient.

## REFERENCES

- Leffert L, Butwick A, Carvalho B, Arendt K, Bates S, Friedman A, Horlocker T, Houle T, Landau R. The Society for Obstetric Anesthesia and Perinatology Consensus Statement on

- Friedman AM, Ananth CV, Prendergast E, Chauhan SP, D'Alton ME, Wright JD. Thromboembolism incidence and prophylaxis during vaginal delivery hospitalizations. *Am J Obstet Gynecol*. 2015;212:221.e1–221.e12.

## Approval

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