



## Use of Antithrombotic Medications In The Presence of Neuraxial Anesthesia

**Purpose of Guidelines:** To establish appropriate administration and timing of antithrombotic medications before, during, and after the use of neuraxial anesthesia to minimize the risk of bleeding.

### Definitions:

- **Neuraxial Anesthesia** = Delivery of anesthetic medication requiring placement of catheters or needles into the epidural or spinal space
- **Antithrombotic Medications** = Anticoagulant, antiplatelet, and thrombolytic medications

### Background<sup>1-3</sup>:

Spinal (or epidural) hematomas are a rare but catastrophic complication of neuraxial anesthesia. The risk of hematoma development is increased in the presence of antithrombotic medication. Patients undergoing neuraxial anesthesia must have the risks of bleeding from neuraxial interventions balanced with the underlying and ongoing risk of thromboembolism necessitating anticoagulation.

Recommendations for the management of specific antithrombotics in patients undergoing neuraxial anesthesia are provided in the following Tables:

- [Table 1. Management of Intravenous and Subcutaneous Anticoagulation Therapy in Patients Undergoing Neuraxial Anesthesia](#)
- [Table 2. Management of ORAL Anticoagulation Therapy in Patients Undergoing Neuraxial Anesthesia](#)
- [Table 3. Management of ORAL and Intravenous Antiplatelet and Thrombolytic Therapy in Patients Undergoing Neuraxial Anesthesia](#)

### Workflow if a Contradicted Medication is Prescribed:

- Providers will have the opportunity to document the name of the approving anesthesiologist during order entry if the contraindicated medication was approved after discussion with the provider
- Anesthesia providers and the Regional Anesthesiology and Acute Pain Service (RAAPS) can discontinue antithrombotic therapy during clinical review and coordinate with surgical providers if replacement medication is required
- Pharmacist will review orders for antithrombotics in patients receiving neuraxial anesthesia and will collaborate with providers to resolve possible contraindications
- Pharmacists will communicate with providers when a contraindicated antithrombotic is ordered without documentation of approval by an anesthesiologist or RAAPS provider and therefore cannot be verified
- If a contraindicated medication is ordered to start before the "Minimum Time Before Next Dose After Neuraxial Puncture/Catheter Manipulation or Removal" has occurred the pharmacist will re-time dose to avoid conflict

### Anesthesia Contacts for Patient-Specific Concerns:

Use the AMCOM directory and search [On-Call Schedules](#) based on day and hospital site:

- Froedtert Memorial Lutheran Hospital: Search 'Anesthesia FMLH' and then contact RAAPS
- Community Memorial Hospital: Search 'Anesthesia CMH'
- Saint Joseph's Hospital: Search 'Anesthesia SJH'

### Important Notes:

- Traumatic/Bloody needle placement increases the risk for bleeding complications and anesthesia staff will discuss possible risks with surgical providers before initiation of surgical cases.
- The decision to perform a neuraxial block on a patient receiving perioperative anticoagulation must be made on an individual basis by weighing the risk of spinal hematoma with the benefits of regional anesthesia

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Table 1. Management of Intravenous and Subcutaneous Anticoagulation Therapy in Patients Undergoing Neuraxial Anesthesia<sup>1-3</sup>

MEDICATION	Last Dose Before Neuraxial Puncture/ Catheter Manipulation or Removal	While Neuraxial/Nerve Catheter in Place  Green=No Restriction Yellow= See Comments Red= Contraindicated	Minimum Time Before Next Dose After Neuraxial Puncture/ Catheter Manipulation or Removal	Notes  T ½= Half-life elimination  Half-life can be prolonged if advanced age or renal dysfunction present  Consider frequent follow up neuro check if agents used outside guidelines
<u>Prophylactic (Standard Dose)</u> Heparin, Unfractionated (UFH)  5000 Units Subcut Q8h/Q12h  7500 Units Subcut Q12h	At Least 4 hours (Prefer 6 hours)		1 Hour	When given for >4 days, check platelets (risk of HIT) prior to insertion or removal. T½ is 1 to 2 hours
<u>Prophylactic (High Dose)</u> Heparin, Unfractionated (UFH)  7500 Units Subcut Q8h (in patients weighing ≥100 kg)	12 hours		1 Hour	Consider obtaining a heparin level; 10% to 15% of patients on TID heparin subcut may have elevated levels
<u>Therapeutic</u> Heparin, Unfractionated (UFH)	4 to 6 hours and Heparin Level Less Than 0.3	CONTRAINDICATED	1 hour	Bloody/difficult needle placement may increase bleeding risk with subsequent IV heparin; use with caution. Evaluate on a case-by-case basis and discuss with the surgeon prior to intra-operative use
<u>Prophylactic</u> Enoxaparin (LOVENOX) Subcut  30 mg Q12h or 40 mg daily	12 hours	CONTRAINDICATED	4 Hours (Wait 12 hours after spinal or paravertebral block)	T½ is 4.5 to 7 hours;

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Table 1. Management of Intravenous and Subcutaneous Anticoagulation Therapy in Patients Undergoing Neuraxial Anesthesia continued<sup>1-3</sup>

MEDICATION	Last Dose Before Neuraxial Puncture/ Catheter Manipulation or Removal	While Neuraxial/Nerve Catheter in Place  Green=No Restriction Yellow= See Comments Red= Contraindicated	Minimum Time Before Next Dose After Neuraxial Puncture/ Catheter Manipulation or Removal	Notes  T <sub>1/2</sub> = Half-life elimination  Half-life can be prolonged if advanced age or renal dysfunction present  Consider frequent follow up neuro check if agents used outside guidelines
<u>Therapeutic</u> Enoxaparin (LOVENOX) Subcut  1mg/kg Q12h or 1.5mg/kg daily	24 hours	CONTRAINDICATED	4 hours (wait 24 hours to start after spinal or paravertebral block)	T <sub>1/2</sub> is 4.5 to 7 hours; Delay start 24 h after traumatic neuraxial placement
<u>Prophylactic</u> Dalteparin (FRAGMIN)  2500 to 5000 Units Subcut daily	12 hours	CONTRAINDICATED	6 hours	T <sub>1/2</sub> is 3 to 5 hours
<u>Therapeutic</u> Dalteparin (FRAGMIN) Subcut  100 to 120 Units/kg Q12h or 200 units/kg daily	24 hours	CONTRAINDICATED	6 hours	T <sub>1/2</sub> is 3 to 5 hours
<u>Prophylactic</u> Fondaparinux(ARIXTRA)  2.5mg Subcut daily	36-42 hours	CONTRAINDICATED	6 hours	T <sub>1/2</sub> is 17 to 21 hours
<u>Therapeutic</u> Fondaparinux (ARIXTRA)  5 to 10 mg Subcut Daily	72 hours	CONTRAINDICATED	6 hours	T <sub>1/2</sub> is 17 to 21 hours
<u>Therapeutic</u> Argotroban	Hold for 4 to 6 hours and wait until aPTT < 40 sec	CONTRAINDICATED	2 hours	T <sub>1/2</sub> is 39 to 51 minutes (prolonged with hepatic insufficiency)
<u>Therapeutic</u> Bivalirudin (ANGIOMAX) Lepirudin (REFLUDAN)	Hold for 4 to 6 hours and wait until aPTT is back to baseline	CONTRAINDICATED	2 hours	T <sub>1/2</sub> is bivalirudin 25 minutes

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Table 2. Management of ORAL Anticoagulation Therapy in Patients Undergoing Neuraxial Anesthesia<sup>1-4</sup>

MEDICATION	Last Dose Before Neuraxial Puncture/ Catheter Manipulation or Removal	While Neuraxial/Nerve Catheter in Place  Green=No Restriction Yellow= See Comments Red= Contraindicated	Minimum Time Before Next Dose After Neuraxial Puncture/ Catheter Manipulation or Removal	Notes  T ½= Half-life elimination  Half-life can be prolonged if advanced age or renal dysfunction present  Consider frequent follow up neuro check if agents used outside guidelines
<u>Therapeutic</u> Warfarin (COUMADIN)	4 to 5 days INR ≤ 1.4	CONTRAINDICATED	2 hours	T½ is 20 to 60 hours, highly variable among individuals INR < 1.4 prior to catheter removal but can be higher in some situations with frequent neuro checks
<u>Prophylactic</u> Apixaban(ELIQUIS)2.5 mg PO BID	30 hours	CONTRAINDICATED	6 hours	T½ is 12 hours
<u>Therapeutic</u> Apixaban (ELIQUIS) 5 mg PO BID (starting dose 10 mg BID)	3 days	CONTRAINDICATED	6 hours	T½ is 12 hours
<u>Prophylactic</u> Rivoraxaban(XARELTO) 2.5 mg PO BID or 10 mg PO daily	24 hours	CONTRAINDICATED	6 hours	T½ is 5 to 9 hours (prolonged with elderly) RENAL: Do not perform if CrCl<30mL
<u>Therapeutic</u> Rivoraxaban(XARELTO) 15 to 20 mg PO Daily	3 days (65-72 hours)	CONTRAINDICATED	6 hours	T½ is 5 to 9 hours (prolonged with elderly) RENAL: Do not perform if CrCl<30 mL
Edoxaban (SAVAYSA) 30 to 60 mg daily	3 days	CONTRAINDICATED	6 hours	T½ is 11 to 14 hours
Dabigatran (PRADAXA) 150 mg PO BID	3-5 days CrCl>80 ml then 3 days if<50-79 ml then 4 days if 30-49 ml then 5 days	CONTRAINDICATED	6 hours	T½ is 12-17 hours RENAL: Do not perform if CrCl<30 mL.
Betrixaban (BEVYXXA) 80-160 mg loading dose 40 to 80 mg daily	3 days	CONTRAINDICATED	6 hours	T½ is 19-27 hours

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Table 3. Management of ORAL and Intravenous Antiplatelet and Thrombolytic Therapy in Patients Undergoing Neuraxial Anesthesia<sup>1-3,5</sup>

MEDICATION	Last Dose Before Neuraxial Puncture/ Catheter Manipulation or Removal	While Neuraxial/Nerve Catheter in Place  Green=No Restriction Yellow= See Comments Red= Contraindicated	Minimum Time Before Next Dose After Neuraxial Puncture/ Catheter Manipulation or Removal	Notes  T ½= Half-life elimination  Half-life can be prolonged if advanced age or renal dysfunction present  Consider frequent follow up neuro check if agents used outside guidelines
Aspirin	No Restrictions	Doses up to 325 mg twice daily allowed	No restrictions, can give immediately	Recommended patient not on other antithrombotic medications
NSAIDS	No Restrictions		No restrictions, can give immediately	Caution use with other agents that increase risk for bleeding
Clopidogrel (PLAVIX)	7 days	CONTRAINDICATED	6 hours	T½ is Parent drug: 6 hours, active metabolite: 30min
Ticagrelor (BRILINTA)	5 to 7 days	CONTRAINDICATED	6 hours	T½ is 7 hours for drug and 9 hours for active metabolite
Prasugrel (EFFIENT)	7 to 10 days	CONTRAINDICATED	6 hours	T½ is Active metabolite: 7 hours (range 2 to 15 hours)
Aspirin/Dipyridimole (AGGRENOX)	24 hours	CONTRAINDICATED	2 hours	
Cilostazol (PLETAL)	2 Days	CONTRAINDICATED	6 hours	T½ is 11 to 13 hours
Eptifibatide (INTEGRILIN)	8 hours	CONTRAINDICATED	2 hours	T½ is 2.5 hours
Abciximab (REOPRO)	48 hours	CONTRAINDICATED	2 hours	Dissociation half-life: 4 hours (up to 72 hours for restoration of normal hemostasis)
Tirofiban (AGGRASTAT)	8 hours	CONTRAINDICATED	2 hours	T½ is 2 hours
Cangrelor (KENGREAL)	3 hours	CONTRAINDICATED	8 hours	T½ is 3 to 6 minutes
Alteplase (TPA) 2mg dose for catheter clearance	No Restrictions	Max dose 4 mg/24 hr		
FULL DOSE Alteplase (TPA)for Stroke or MI or PE <sup>1-3</sup> (Tenecteplase or Reteplase)	10 days	CONTRAINDICATED	10 days	

## **HISTORICAL INFORMATION**

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## **References:**

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