

## Guidelines for Neuraxial Anesthesia and Anticoagulation

**NOTE:** 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 for a particular patient.

<i>Medication</i>	<i>Prior to Catheter Placement</i> (Minimum time between the last dose of anticoagulant and initial catheter placement)	<i>With Catheter in Place</i> (When to restart anticoagulation therapy once the catheter has been placed)	<i>Prior to Catheter Removal</i> (Time between the last dose of anticoagulant and catheter removal)	<i>After Catheter Removal</i> (When to restart anticoagulation therapy once catheter has been removed)	<i>Additional Info</i>	<i>Half Life</i>
<b>Heparin</b>						
IV Heparin	Wait until PTT < 40 Usual hold time 4 hours	<b>Avoid While Catheter is in Place</b>		2 hours	Perform neuro check 12 hours after cath removal	1-2 hrs
SC Heparin (>5000 units)	Wait until PTT < 40 Usual hold time 12 hours					
SC Heparin TID (≤ 5000 units)	Hold AM dose and check PTT prior to placement	<b>No restrictions</b>	Hold AM dose check PTT prn		Use of compression device is also recommended	
SC Heparin BID (≤ 5000 units)						
<b>Warfarin</b>						
Warfarin (Coumadin®)	When INR < 1.4 Usual hold time 4-5 days	<b>Avoid While Catheter is in Place</b>	May receive first dose 24 hours prior to cath removal but INR must be < 1.5 prior to removal	2 hours	Reversal – Vitamin K or FFP. Perform neuro check 24 hours after cath removal	20-60 hrs

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<b><i>LMWH (Low Molecular Weight Heparins)</i></b>						
<b>Therapeutic Dosing:</b> <u>Enoxaparin (Lovenox®):</u> 1mg/kg SC bid OR 1.5mg/kg daily <u>Dalteparin:</u> 120 units/kg BID OR 200 units/kg daily <u>Tinzaparin:</u> 175 units/kg daily	24 hours	<b>Avoid While Catheter is in Place</b>		4 hours	Hold time may be longer in patients with renal impairment (CrCl < 30ml/min)	4-7 hrs
<b>Prophylactic Dosing:</b> <u>Enoxaparin (Lovenox®):</u> 30 mg bid SQ, 40 mg SQ daily	At least 12 hours, 24 hours is recommended					
<b><i>Factor X-a Inhibitors</i></b>						
Fondaparinux (Arixtra®)	72 hours	<b>Avoid While Catheter is in Place</b>		12 hours	Consider longer hold time in patients with renal impairment (CrCl <50-30 mL/min) Contraindicated in CrCl < 30 mL/min	17-21 hrs
Rivaroxaban (Xarelto®)	24 hours			6 hours (24 hours for traumatic punctures)	Longer hold times in patients with renal impairment	5-9 hrs
Apixaban (Eliquis®)	48 hours			6 hours (24 hours for traumatic punctures)		6-12 hrs

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<b>Direct Thrombin Inhibitors</b>						
Argatroban	Wait until aPTT < 40	<b>Avoid While Catheter is in Place</b>	2 hours		Half-life in hepatic impairment ~ 181 min	40-50 min
Bivalirudin (Angiomax®)					Half- life with CrCl 10-29 mL/min ~ 57 min	25 min
Lepirudin (Refludan®)					Half- life with CrCl <15 mL/min up to 2 days	1-3 hrs
Dabigatran (Pradaxa®)	5 days		6 hours (24 hours for traumatic punctures)	Longer hold times in patients with renal impairment	8-17 Hrs	
<b>Anti-Platelet Agents*</b> - See footnote on page 4 regarding risk of thrombosis if discontinued following stent placement						
Aspirin	<b>No restrictions</b>					
Clopidogrel (Plavix®)	7-10 days	<b>Avoid While Catheter is in Place</b>	2 hours			
Cilostazol (Pletal®)	42 hours		5 hours	Consider extending time prior to cath placement in patients with renal impairment	11-13 hrs	
Dipyridamole/ASA (Aggrenox®)	24 hours		2 hours			
Prasugrel (Effient®)	7-10 days		6 hours			
Ticagrelor (Brilinta®)	5-7 days		6 hours			
Ticlopidine (Ticlid®)	10-14 days		2 hours			

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<b><i>Fibrinolytics</i></b>						
Streptokinase	10 days	<b>Avoid While Catheter is in Place</b>	10 days			18-83 min
Alteplase						26-46 min
Tenecteplase						115 min
Retepase						13-16 min
<b><i>Glycoprotein IIb/IIIa inhibitors</i></b>						
Abciximab (Reopro®)	48 hours	<b>Avoid While Catheter is in Place</b>	2 hours			
Eptifibatide (Integrilin®)	8 hours					
Tirofiban (Aggrastat®)	8 hours					

\*Perioperative antiplatelet management for patient with coronary stents (Please consult cardiology for patient on DAPT for stent <12 months):

Patients with recent coronary stent placement who require surgery present a complex treatment dilemma. These patients are typically on dual anti-platelet therapy (DAPT) - aspirin plus a P2Y12 platelet inhibitor (clopidogrel/Plavix, prasugrel/Effient, or ticagrelor/Brilinta). Prematurely discontinuing dual anti-platelet therapy after stent implantation can result in sub-acute stent thrombosis, which is associated with a high incidence of transmural myocardial infarction and death. Surgery creates an inflammatory pro-thrombotic state, which greatly increases the risk of thrombosis in stents that have not completely re-endothelialized. The risk of late stent thrombosis is particularly elevated in patients in whom aspirin and the P2Y12 platelet inhibitor are both stopped and then surgery is performed. Please see [Intermountain guidelines for perioperative antiplatelet management for patients with coronary stents](#) for detailed information.