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.

MEDICATION	HOLD MEDICATION Before Procedure	RESTART MEDICATION After Procedure	HOLD MEDICATION Before Catheter Removal	RESTART MEDICATION After Catheter Removal	Additional Info	Half Life
Heparin						
IV Heparin	Wait until PTT <40 Usual hold time: 4-6 hours	1 hour *If bloody tap, discuss risks and benefits with proceduralist*	4-6 hours after last heparin dose and confirm PTT < 40	1 hours	Preform frequent neuro check after catheter removal	1-2 hours
SC Heparin 5000 units BID or TID	4-6 hours or check PTT <40	No delay	4-6 hours prior to catheter removal	No delay		
SC Heparin 7500-10,000 units BID (or ≤ 20,000 units per day)	12 hours and PTT < 40	Avoid while catheter is in place See app	Avoid while catheter is in place See app	Perform neuro checks 12 hours after catheter removal	Risks and benefits for epidural placement (prior to PTT results) should be assessed on an individual basis	
SC Heparin >20,000 per day	24 hours and check PTT< 40	Assess individual case; monitor neuro checks	Assess individual case; monitor neuro checks	Assess individual case; monitor neuro checks	Assess individual case; monitor neuro checks	
Warfarin						
Warfarin (Coumadin®)	5 days; INR ≤1.2 If first dose given prior to surgery >24hrs check INR	No delay	INR < 1.5; remove catheter INR >1.5 and<3.0; catheter may be maintained with caution and frequent neuro checks INR >3.0; hold warfarin dose if catheter in place	No delay	Neuro checks for 24 hours; Reversal possible with vitamin K, PCC or FFP	20-60 hours

Last updated November 2018 by Anticoagulation Task Force and Anesthesia Development Team. Approved by Pharmacy & Therapeutics Committee: December 2018

LMWH (Low Molecular Weight Heparins)

MEDICATION	HOLD MEDICATION Before Procedure	RESTART MEDICATION After Procedure	HOLD MEDICATION Before Catheter Removal	RESTART MEDICATION After Catheter Removal	Additional Info	Half Life
Therapeutic Dosing: Exonaparin (Lovenox): 1mg/kg SC BID or 1.5mg/kg QD Dalteparin: 120units/kg BID or 200 units/kg QD Tinzaparin: 175 units/kg QD	24 hours; consider checking anti-factor XA activity level elderly/renal insufficiency	24-72 hours (24 hours after non-high risk bleeding surgery; 48-72 hours after high risk surgery)	Catheter should be removed before initiation LMWH	4 hours prior to the first postoperative dose and at least 24 hours after neuraxial procedure.	May need to wait >24 hours after bloody tap to restart medication.	4-7 hours
Prophylactic Dosing: Enoxaparin (Lovenox): 30mg SQ BID, 40 mg SQ QD	At least 12 hours	12 hours	Avoid	4 hours, no earlier than 12 after neuraxial procedure	In OB patients – medication restart in 6-12 hours as long as catheter has been out at least 4 hours and tap was not traumatic. Wait at least 24 hours for traumatic tap. *ASRA page 290*	

Factor X-a Inhibitors

MEDICATION	HOLD MEDICATION Before Procedure	RESTART MEDICATION After Procedure	HOLD MEDICATION Before Catheter Removal	RESTART MEDICATION After Catheter Removal	Additional Info	Half Life
Fondaparinux (Arixtra®)	ASRA Regional- no recommendation Pain- 4 day (5 half lives)	Avoid while Catheter is in place		6 hours	Consider longer hold time in patients with renal impairment (CrCl <50-30 ml/min) Contraindicated in CrCl <30ml/min or Child-Pugh C hepatic failure	17-21 hours

Rivaroxaban (Xarelto®)	72 hours	At least 6 hours; Avoid while Catheter is in place	22-26 hours	6 hours *If bloody tap, discuss risks and benefits with proceduralist*	Consider longer hold times in patients with renal impairment (CrCl <50-30 ml/min) Contraindicated in CrCl <15ml/min or Child-Pugh B or C hepatic failure	5-9 hours
Apixaban (Eliquis®)	72 hours	At least 6 hours; Avoid while Catheter is in place	26-30 hours	6 hours *If bloody tap, discuss risks and benefits with proceduralist*	Consider longer hold times in patients with renal impairment Contraindicated in CrCl <15ml/min or Child-Pugh B or C hepatic failure	6-12 hours
Edoxaban (Savaysa®)	72 hours	At least 6 hours; Avoid while Catheter is in place	20-28 hours	6 hours *If bloody tap, discuss risks and benefits with proceduralist*	Consider longer hold times in patients with renal impairment (CrCl <50-30 ml/min) Contraindicated in CrCl <15ml/min or Child-Pugh B or C hepatic failure	10-14 hours

Direct Thrombin Inhibitors

MEDICATION	HOLD MEDICATION Before Procedure	RESTART MEDICATION After Procedure	HOLD MEDICATION Before Catheter Removal	RESTART MEDICATION After Catheter Removal	Additional Info	Half Life
Argatroban	Avoid	Avoid while catheter is in place	34-36 hours	2 hours	Half-life in hepatic impairment ~ 181 min	40-50 minutes
Bivalirudin (Angiomax®)	Avoid	Avoid while catheter is in place	34-36 hours	2 hours	Half-life with CrCl 10-29 ml/min ~ 57 min	25 min
Dabigatran (Pradaxa®)	120 hours- 5 days (11.1) OR 72 hours CrCl ≥ 80 96 hours CrCl 50-79 120 hours CrCl 30-49 CrCl < 30- avoid neuraxial block Chronic Pain Therapy: 4 days (5-6 days if renal impairment) TPO: 5 days	6 hours; Avoid while catheter is in place	34-36 hours	6 hours (11.2) 24 hours for traumatic puncture	Consider longer hold times in patients with renal impairment (Prescribing provider should make recommendation for when to discontinue) Reversal possible with idarucizumab	8-17 hours

*Anti-Platelet Agents** - See footnote regarding risk of thrombosis if discontinued following stent placement

MEDICATION	HOLD MEDICATION Before Procedure	RESTART MEDICATION After Procedure	HOLD MEDICATION Before Catheter Removal	RESTART MEDICATION After Catheter Removal	Additional Info	Half Life
Aspirin	**No restrictions**					
Clopidogrel (Plavix®)	5-7 days	Immediately if NO loading does; 6 hours- see app	1-2 days- see app 24 hours postop; 0 post neuraxial procedure	0 hours; 6 hours if loading dose		~6 hours (metabolites longer)
Cilostazol (Pletal®)	48 hours	6 hours; Avoid while Catheter is in place	Avoid	6 hours	Consider extending time prior to catheter placement if renal impairment	11-13 hours

Dipyridamole/ASA (Aggrenox®)	24 hours	6 hours; Avoid while Catheter is in place	Avoid while catheter is in place	6 hours		10-12 hours (dipyridamole component)
Prasugrel (Effient®)	7-10 days	Immediately if no loading dose; Avoid while Catheter is in place. See app TPO- 6 hours	Avoid-See app	24 hours postop; Immediately post neuraxial procedure; 6 hours if loading dose See app TPO- 6 hours		2-15 hours
Ticagrelor (Brilinta®)	5-7 days	Immediately if no loading dose; Avoid while Catheter is in place. See app TPO- 6 hours	Avoid See app	24 hours postop; Immediately post neuraxial procedure; 6 hours if loading dose See app TPO- 6 hours		~7 hours (~9 hours for metabolite)
Ticlodipine (Ticlid®)	10 days	Avoid while Catheter is in place	6 hours	24 hours postop; Immediately post neuraxial procedure; 6 hours if loading dose		~13 hours
Cangrelor	3 hours	8 hours	Avoid	8 hours		~3-6 minutes
Fibrinolytics						
MEDICATION	**HOLD MEDICATION Before Procedure**	**RESTART MEDICATION After Procedure**	**HOLD MEDICATION Before Catheter Removal**	**RESTART MEDICATION After Catheter Removal**	**Additional Info**	**Half life**
Streptokinase	10 days 48 hours + normal clotting studies including fibrinogen (for unusual circumstances)	Avoid while Catheter is in place	Avoid while Catheter is in Place; If unanticipated/event neurologic checks Q2 hrs, change infusion to be able to monitor	Check Fibrinogen Level	TPO- verify normal clotting studies including fibrinogens. If unanticipated/event neurologic checks Q 2 hours, change infusion to be able to monitor	18-83 minutes

Alteplase	10 days 48 hours + normal clotting studies including fibrinogen (for unusual circumstances)	Avoid while Catheter is in place If unanticipated event- neurologic checks Q2 hrs, change infusion to be able to monitor	Check Fibrinogen Level		26-46 hours
Tenecteplase	10 days 48 hours + normal clotting studies including fibrinogen (for unusual circumstances)	Avoid while Catheter is in place If unanticipated event- neurologic checks Q2 hrs, change infusion to be able to monitor	Check Fibrinogen Level		115 minutes
Reteplase	10 days 48 hours + normal clotting studies including fibrinogen (for unusual circumstances)	Avoid while Catheter is in place If unanticipated event- neurologic checks Q2 hrs, change infusion to be able to monitor	Check Fibrinogen Level		13-16 minutes

Glycoprotein IIb/IIIa inhibitors

MEDICATION	HOLD MEDICATION Before Procedure	RESTART MEDICATION After Procedure	HOLD MEDICATION Before Catheter Removal	RESTART MEDICATION After Catheter Removal	Additional Info	Half life
Abciximab (Reopro®)	24-48 hours	Avoid while Catheter is in Place	Avoid while Catheter is in Place	Contraindicated 4 weeks post op	(receptor-bound remain for up to 2 weeks)	~30 min
Eptifibatide (Integrillin®)	4-8 hours	Avoid while Catheter is in Place	Avoid while Catheter is in Place	Contraindicated 4 weeks post op		~2.5 hours
Tirofiban (Aggrastat®)	4-8 hours	Avoid while Catheter is in Place	Avoid while Catheter is in Place	Contraindicated 4 weeks post op		~2 hours

2018 updates based on American Society of Regional Anesthesia and Pain Medicine (ASRAZ) April 2018Guidelines. More details are also available via mobile device application.