



**QUEEN'S UNIVERSITY
DEPARTMENT OF ANESTHESIOLOGY AND
PERIOPERATIVE MEDICINE**

SUBJECT:	Guidelines for the management of anticoagulant medications prior to neuraxial procedures	NUMBER	
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PREAMBLE:

Many patients are on anticoagulant medications for a variety of indications. Although minimal anticoagulant activity is desirable in the perioperative setting, discontinuing all anticoagulant medications may place the patient at an unacceptably high risk of thrombotic complications. Therefore, a thoughtful analysis of the indications for anticoagulation, risks of perioperative bleeding and pharmacodynamic properties of the drug must be taken into consideration. The following guideline, based on the most recent American Society of Regional Anesthesia (ASRA) recommendations, should be considered in this risk/benefit analysis.

GUIDELINES:

1. **Warfarin (Coumadin).** For moderate to high bleeding risk and for those patients who may receive neuraxial procedures, recommend giving the last dose 5 days before surgery and repeating INR on the morning of surgery. May consider holding for longer periods if INR is unusually high (e.g. >3).
2. **Dabigatran (Pradaxa™).** Dabigatran is a direct thrombin inhibitor with an extremely variable half-life. With normal renal function the half-life is 11-22h which increases to 22-35h for those with moderate to severe renal impairment. The levels peak in 1-2 hours. For moderate to high bleeding risk and for those patients who may receive neuraxial procedures, consider giving the last dose 4 days before surgery for those with normal renal function and 6 days for those with renal impairment. INR and aPTT do not provide a reliable measure of its activity. To confirm an absent anticoagulant effect, thrombin clotting time (TCT) can be used. However it is too sensitive, detecting clinically irrelevant drug levels and running the risk of over interpretation. TCT is not recommended for routine testing on the day of surgery. Dabigatran may be started 6h following a neuraxial procedure. Consider delaying for 24h if there was a traumatic or bloody tap. Epidural catheters should not be routinely used for postoperative analgesia while taking dabigatran.
3. **Rivaroxiban (Xarelto™).** Rivaroxiban is a direct Factor Xa inhibitor. The half life is 11-13h and is only slightly prolonged in renal impairment. For moderate to high bleeding risk and for those patients who may receive neuraxial procedures, recommend giving the last dose 3 days prior to surgery. Rivaroxiban may be started 6h following a neuraxial procedure. Consider delaying for 24h if there was a traumatic or bloody tap. Epidural catheters should not be routinely used for postoperative analgesia while taking rivaroxaban.
4. **Apixaban (Eliquis™).** Apixaban is a reversible inhibitor of Factor Xa. The half life is 10-15h and is only slightly prolonged in renal impairment. For moderate to high bleeding risk and for those patients who may receive neuraxial procedures, recommend giving the last dose 3 days prior to surgery.

5. **Edoxaban (Lixiana™).** Edoxaban is a reversible inhibitor of Factor Xa. The half life is 10-14h and is slightly prolonged in renal impairment. For moderate to high bleeding risk and for those patients who may receive neuraxial procedures, recommend giving the last dose 3 days prior to surgery.
6. **Heparin.** Unfractionated heparin, either q12h or q8h, should be held on the morning of surgery if the patient may undergo a neuraxial procedure. It may be restarted 1-2h after the neuraxial procedure. A platelet count should be obtained prior to surgery if the patient has been on heparin for >5d as there is a risk of HITT. Unfractionated heparin may be continued during epidural analgesia provided attention is paid with regard to the timing of epidural catheter removal (ie 8-12h after the last dose).
7. **Low Molecular Weight Heparin (LMWH).** The most commonly used LMWH in Kingston is Dalteparin. Prior to a neuraxial procedure, the last dose should be at least 12 hours for prophylactic doses and 24 hours for therapeutic doses. It may be restarted no earlier than 6-8 hours after a neuraxial procedure. Consideration should be given to increasing this to 24h if one has a bloody or traumatic procedure. Specific recommendations regarding timing of catheter removal and re- starting LMWH should be made on an individual basis considering dose and patient factors. Refer to the ASRA guidelines for details.

References:

1. Narouze et al, Reg Anesth Pain Med, 2017 Dec 22 (epub ahead of print)
2. Gulseth et al, Pharmacotherapy, 2011;31(12): 1232-49
3. Llau and Ferrandis, Curr Opin Anaesthesiol 2009; 22:661-6
4. van Ryn et al, Thrombosis and Hemostasis 103.6/2010; 1116-27
5. Eerenberg et al. Circulation Oct 2011, 1573-9

Generic Name	Trade Name	Half Life (h)	Last Dose before Neuraxial Block	Minimal Interval Following Neuraxial Procedure
Warfarin	Coumadin	20-60	5 days	At discretion of surgeon
Dabigatran CrCl < 50	Pradaxa™	11-22 22-35	4 days 6 days	24 hours
Rivaroxiban	Xarelto™	11-13	3 days	24 hours
Apixaban	Eliquis™	10-15	3 days	24 hours
Edoxaban	Lixiana	10-14	3 days	24 hours
Heparin sc		1-2	8-12 hours	1-2 hours
LMWH 5000u daily >5000 daily	Dalteparin	4-6	12 hours 24 hours	6-8 hours Consider longer if traumatic See ASRA guidelines

Example “Last Dose 3 days prior to surgery” - means the last dose of the drug is given 72 hours before the surgical procedure. For surgery on Monday, the last dose would be Friday morning.

Friday	Day - 3	Take drug
Saturday	Day - 2	Do not take drug
Sunday	Day - 1	Do not take drug
Monday	Day 0	Do not take drug