UAB INTERVENTIONAL NEPHROLOGY ANTICOAGULATION PROTOCOL

Prepared by:

AMMAR ALMEHMI, MD

UAB INTERVENTIONAL NEPHROLOGY ANTICOAGULATION MANAGEMENT

Table 1: Table of risk of procedure for Management of Anticoagulants *(AJR: 205, August 2015)*

Category	1. No labs –minimal Risk	2. Low risk	3. Moderate risk	4. High Risk
PROCEDURE	-Non-tunneled CVC placement/removal -Small bore tunneled CVC placement/removal (<9Fr) -Venous port placement/removal*	-Large bore tunneled (=/>9 Fr) CVC placement (bard power flow) -Large bore tunneled CVC removal. - Dialysis access venous interventions**	- Dialysis access arterial interventions (arterial intervention with access size up to 7F)	-Renal biopsy
TESTS	No tests except -INR (If on Warfarin/Cirrhosis) -aPTT (if on Heparin) -PLTS (not routinely recommended unless known thrombocytopenia)	INR aPTT (if on Heparin) Platelets	INR aPTT (if on Heparin) Platelets	INR aPTT (if on Heparin) Platelets Hematocrit
THRESHOLD TO TREAT	INR >2 (FFP/5-10mg PO Vit K) PLTS<20(Except <50 for ports)	INR >2 (FFP/5-10mg PO Vit K) PLTS<20(Except <30 for TJLB & LP)	INR>1.5 Plt<50,000 aPTT >1.5 xcontrol	INR>1.5 Plt<50,000 aPTT >1.5 xcontrol

CVC: central venous catheter; PLTS: platelets; INR: international normalized ratio; aPTT: activated partial thromboplastin time; FFP: fresh frozen plasma

Table 2: Table of Recommendations for Management of Anticoagulants *(AJR: 205, August 2015)*

	Interval between Last Dose and Procedure			Resumption after Procedure		
Medication	**Low Risk**	**Medium Risk**	**High Risk**	**Low Risk**	**Medium Risk**	**High Risk**
Warfarin	5d	5d	5d	12h	12h	12-24h
UFH (IV)	1h	4h	4h	1h	1h	1hr
UFH (SQ)	4h	4h	6h	Immediate	Immediate	1h
LMWH* (SQ)	12h	12h	12h	6h	6h	6h
Dabigatran(Pradaxa)	24h	48h	72h	24h	48h	48h
Rivaroxaban (Xarelto)	24h	48h	48h	24h	48h	48h
Apixaban (Eliquis)	24h	48h	72h	24h	48h	48h
Fondaparinux (Arixtra)	24h	36h	48h	6h	6h	6h
Argatroban (Acova)	None	4h	4h	1h	1h	1h
Desirudin (Iprivask)	None	4h	4h	1h	1h	1h
Bivalirudin (Angiomax)	None	4h	4h	1h	1h	1h

* LMWH:low molecular weight heparin includes: Dalteparin (Fragmin[R]), Enoxaparin (lovenox[R]), and Tinzaparin (Innohep[R])

Arterial and nonvascular procedures: Stop heparin 4 hrs before the procedure. **Venous** – Turn off heparin when patient is called for.

Table 3: Current Medications and Management Recommendations ***(JVIR: 24, May 2013)***

Medications	Low Risk Procedure	Moderate Risk Procedure	High Risk Procedure
Warfarin (Coumadin)*	Withhold 3-5d, INR ≤ 2.0	Withhold 5d, INR ≤ 1.5	Withhold 5d, INR ≤ 1.5
Aspirin (ASA)	Do not withhold	Do not withhold	Withhold 5d before procedure
Heparin (UFH)	No consensus (✓aPTT)	73% consensus to correct if ≥ 1.5x control	Withhold 2-4h before procedure (aPTT ≤ 1.5x control)
LMWH (therapeutic)	Withhold 1 dose or 12h before procedure	Withhold 1 dose or 12h before procedure	Withhold 2 doses or 24h before procedure
Fondaparinux (Arixtra)	Do not withhold	Withhold 2-3d CrCl ≥ 50 mL/min 3-5d CrCl ≤ 50 mL/min	Withhold 2-3d CrCl ≥ 50 mL/min 3-5d CrCl ≤ 50 mL/min
Thienopyridines			
Clopidogrel (Plavix)	Withhold 0-5d before procedure	Withhold 5d before procedure	Withhold 5d before procedure
Prasurgrel (Effient)			
Ticlopidine (Ticlid)	Withhold 0-5d before procedure	Withhold 7d before procedure	Withhold 7d before procedure
Direct thrombin inhibitors			
Argatroban	Do not withhold	Defer procedure until off medication. If emergent, withhold 4h before procedure	Defer procedure until off medication. If emergent, withhold 4h before procedure
Bivalirudin (Angiomax)	Do not withhold	Defer procedure until off medication. If emergent, withhold 4h before procedure 2-3h CrCl ≥ 50 mL/min 3-5h CrCl ≤ 50 mL/min	Defer procedure until off medication. If emergent, withhold 4h before procedure 2-3h CrCl ≥ 50 mL/min 3-5h CrCl ≤ 50 mL/min
Dabigatran (Pradaxa)	Do not withhold	Defer procedure until off medication. If emergent, withhold 2-3d CrCl ≥ 50 mL/min 3-5d CrCl ≤ 50 mL/min	Defer procedure until off medication. If emergent, withhold 2-3d CrCl ≥ 50 mL/min 3-5d CrCl ≤ 50 mL/min
Glycoprotein IIb/IIIa inhibitors			
Short-acting: eptifibatide (Integrilin), tirofiban (Aggrastat)	Withhold immediately before procedure	Withhold 4h before procedure	Withhold 4h before procedure
Long-acting: abciximab (ReoPro)	Withhold 12-24h before procedure (aPTT ≤ 50s, ACT** ≤ 150s)	Withhold 24h before procedure (aPTT ≤ 50s, ACT ≤ 150s)	Withhold 24h before procedure (aPTT ≤ 50s, ACT ≤ 150s)
NSAIDS			
Short-acting (half-life 2-6 h): ibuprofen, diclofenac, ketoprofen, indomethacin	Do not withhold	Do not withhold	Withhold 24h before procedure
Intermediate-acting (7-15 h): naproxen, sulindac, diflunisal, celecoxib	Do not withhold	Do not withhold	Withhold 2-3d before procedure
Long-acting (> 20 h): meloxicam, nabumetone, piroxicam	Do not withhold	Do not withhold	Withhold 10d before procedure

*__Common medications are bolded__

**ACT = activated clotting time

Heparin reversal: Protamine sulphate (1-1.5mgIV/100U heparin, max 50mg/dose), Slow IV push or infusion over 5-10min (5mg/min).

May adjust dose based on time from heparin administration: 0-30 min give 1-1.5mg/100 U heparin; 30-6-min give 0.5-0.75mg/100U H; if >2hr give 0.25-0.375mg/100U H. [***Ref***: https://www.ajronline.org/doi/pdf/10.2214/AJR.14.13342]