

# COAGULATION PROTOCOLS

## Diagnostic Imaging Program



**Eastern  
Health**

These guidelines shall be used for patients requiring coagulation parameter surveillance during image-guided procedures in Interventional Radiography, CT, Ultrasound, Mammography, and MRI. To ensure patient care and safety during image-guided procedures requiring coagulation parameter surveillance, ordering physicians are responsible to ensure patients are appropriately prepared prior to the procedure.

It is recognized the risk of holding medications must be balanced with the risk of thrombosis; this is a clinical decision.

**Table 1. Periprocedural Coagulation Parameter Surveillance and Medical Management of Patients Undergoing Percutaneous Image-Guided Procedures**

Category	1 (Low Risk of Bleeding, Easily Detected and Controllable)	2 (Moderate Risk of Bleeding)	3 (Significant Bleeding Risk, Difficult to Detect or Control)
<b>Procedure</b>	Nontunneled venous catheter	Angiography (arterial intervention with access size up to 7-F)	TIPS
	Dialysis access interventions	Venous interventions	Renal and liver biopsy
	Central line removal	Chemoembolization/ radioembolization	Radiofrequency ablation
	IVC filter placement	Uterine fibroid embolization	Nephrostomy tube placement
	Venography	Transjugular liver biopsy	Biliary interventions (new tract)
	Thoracentesis	Tunneled venous catheter	
	Paracentesis	Subcutaneous port device placement	
	Superficial aspiration, drainage, and/or biopsy (excluding intrathoracic or intraabdominal sites)	Spinal procedures (vertebroplasty, lumbar puncture, kyphoplasty, epidural injection, facet block)	
	Joint aspiration/injection*	Biopsy (excluding superficial and renal and liver)	
	Thyroid biopsy*	Breast core biopsy*	
	Breast and axilla: localization, fine needle aspiration*	Percutaneous cholecystostomy	

## COAGULATION PROTOCOLS (CONT'D)

Category	1 (Low Risk of Bleeding, Easily Detected and Controllable)	2 (Moderate Risk of Bleeding)	3 (Significant Bleeding Risk, Difficult to Detect or Control)
	Catheter exchange (biliary, nephrostomy, abscess drainage catheter)**	Enteric tube placement, initial (G-tube/GJ-tube Insertion)  Abscess drainage  Lung Biopsy	
<b>Tests</b>	INR: required  Platelet count: required  Hematocrit: required  aPTT: required if on Heparin infusion	INR: required  Platelet count: required  Hematocrit: required  aPTT: required if on Heparin infusion	INR: required  Platelet count: required  Hematocrit: required  aPTT: required if on Heparin infusion
<b>Thresholds</b>	INR: correct to $\leq 2.0$  Platelets: $\leq 50 \times 10^9/L$ required transfusion	INR: correct to $\leq 1.5$  Platelets: $\leq 50 \times 10^9/L$ required transfusion	INR: correct to $\leq 1.5$  Platelets: $\leq 50 \times 10^9/L$ required transfusion

\* No B/W required unless patient is on Warfarin

\*\*No B/W required

**Table 2. Current Medications and Management Recommendations**

Medications	Procedure Category 1 (Low Bleeding Risk)	Procedure Category 2 (Moderate Risk of Bleeding)	Procedure Category 3 (Significant Bleeding Risk/Bleeding Difficult to Detect)
Warfarin (Coumadin)	Withhold 5 days INR $\leq 2.0$	Withhold 5 days INR $\leq 1.5$	Withhold 5 days INR $\leq 1.5$
Aspirin	Do not withhold	Do not withhold	Withhold 5 days before procedure
Heparin (unfractionated)	Withhold Heparin infusion 4 hours prior to procedure except 1 hour prior to IVC, filter insertion, OR correct aPTT to $\leq 1.5x$ control	Withhold Heparin infusion 4 hours prior to procedure OR correct aPTT to $\leq 1.5x$ control	Withhold Heparin infusion 4 hours before procedure OR correct aPTT to $\leq 1.5x$ control

## COAGULATION PROTOCOLS (CONT'D)

Medications	Procedure Category 1 (Low Bleeding Risk)	Procedure Category 2 (Moderate Risk of Bleeding)	Procedure Category 3 (Significant Bleeding Risk/Bleeding Difficult to Detect)
LMWH	Withhold 12 hours before procedure	Withhold 12 h before procedure	Withhold 12 h before procedure
Fondaparinux	Do not withhold	Withhold 3 days	Withhold 3 days
<b>Thienopyridines</b>			
Clopidogrel (Plavix)	Do not withhold	Withhold for 5 days before procedure except for routine peripheral angiography	Withhold for 5 days before procedure except for routine peripheral angiography
Prasugrel (Effient)	Do not withhold	Withhold for 5 days before procedure	Withhold for 5 days before procedure
Ticlopidine (Ticlid)	Do not withhold	Withhold for 7 days before procedure	Withhold for 7 days before procedure
Ticagrelor	Do not withhold	Withhold for 5 days before procedure except for routine peripheral angiography	Withhold for 5 days before procedure except for routine peripheral angiography
<b>NSAIDs</b>			
Short-acting (half-life 2–6 hours) <ul style="list-style-type: none"> <li>• Ibuprofen</li> <li>• Diclofenac</li> <li>• Ketoprofen</li> <li>• Indomethacin</li> </ul>	Do not withhold	Do not withhold	Withhold 24 hours before procedure
Intermediate-acting (half-life 7–15 hours) <ul style="list-style-type: none"> <li>• Naproxen</li> <li>• Sulindac</li> <li>• Diflunisal</li> <li>• Celecoxib</li> </ul>	Do not withhold	Do not withhold	Withhold 2-3 days before procedure
Long-acting (half-life > 20 hours) <ul style="list-style-type: none"> <li>• Meloxicam</li> <li>• Nabumetone</li> <li>• Piroxicam</li> </ul>	Do not withhold	Do not withhold	Withhold 10 days before procedure

## COAGULATION PROTOCOLS (CONT'D)

Medications	Procedure Category 1 (Low Bleeding Risk)	Procedure Category 2 (Moderate Risk of Bleeding)	Procedure Category 3 (Significant Bleeding Risk/Bleeding Difficult to Detect)
<b>Glycoprotein IIb/IIIa Inhibitors</b>			
Short-acting • Eptifibatid (Integrilin) • Tirofiban (Aggrastat)	Withhold immediately before procedure	Withhold 4 hours before procedure	Withhold 4 hours before procedure
<b>Direct Thrombin Inhibitors and Direct Factor Xa Inhibitors</b>			
Argatroban	Do not withhold	Defer routine procedure until off medication for 4 h	Defer routine procedure until off medication for 4 h
Bivalirudin (Angiomax)	Do not withhold	Defer routine procedure until off medication for 3 h	Defer routine procedure until off medication for 3 h
Dabigatran (Pradaxa)	Do not withhold	Defer routine procedure until off medication for 3 days	Defer routine procedure until off medication for 3 days
Rivaroxaban (xarelto)	Discontinue for 3 days prior	Defer routine procedure until off medication for 3 days	Defer routine procedure until off medication for 3 days
Apixaban (eliquis)	Discontinue for 3 days prior	Defer routine procedure until off medication for 3 days	Defer routine procedure until off medication for 3 days
Edoxaban (lixiana)	Discontinue for 3 days prior	Defer routine procedure until off medication for 3 days	Defer routine procedure until off medication for 3 days

### Definitions & Acronyms

SIR	Society of Interventional Radiology
aPTT	Activated Partial Thromboplastin Time
INR	International Normalized Ratio
IVC	Inferior Vena Cava
LMWH	Low-Molecular-Weight Heparin
NSAIDs	Nonsteroidal Anti-Inflammatory Drugs
TIPS	Transjugular Intrahepatic Portosystemic Shunt

### References:

- Patel et al. (2013). Standards of Practice: *Addendum of Newer Anticoagulants to the SIR Consensus Guideline*, **Journal of Vascular and Interventional Radiology**, Volume 24 Number 5 May 2013, pp 641-645. Accessed on July 16, 2018: [https://www.jvir.org/article/S1051-0443\(12\)01238-9/pdf](https://www.jvir.org/article/S1051-0443(12)01238-9/pdf)
- Website: [www.uptodate.com](http://www.uptodate.com) (2018) Douketis, J. and Lip, G., *Perioperative Management of Patients Receiving Anticoagulants*, Accessed on October 30, 2018: <https://www.uptodate.com/contents/perioperative-management-of-patients-receiving-anticoagulants#H31>
- Sunkara T, Ofori E, Zarubin V, Caughey ME, Gaduputi V, Reddy M. Perioperative Management of Direct Oral Anticoagulants (DOACs): A Systemic Review. *Health Serv Insights*. 2016;9(Suppl 1):25-36. Published 2016 Dec 13. doi:10.4137/HSI.S40701 Accessed on October 30, 2018: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5156547/>