

**Anticoagulation Management Guidelines for Patients having *ELECTIVE* Invasive Procedures in Diagnostic Imaging**

**LOW RISK**

**LOW RISK PROCEDURES**

| MEDICATION  | DISCONTINUE Y/N | STOP RECOMMENDATION                      | RESUME ANTICOAGULATION |
|---|-----------------|--|------------------------|
| <b>Conventional Agents</b>  |                 |  |                        |
| Warfarin (Coumadin)   | Yes             | Hold 3-5 Days pre<br><b>recheck INR</b>  | Evening of Procedure   |
| <b>LMWH:</b> Fragmin=Dalteparin<br>Lovenox=Enoxaparin<br>Innohep=Tinzaparin | Yes             | Hold 12 hrs prior                        | Evening of Procedure   |
| Heparin (Unfractionated)  | Yes             | Hold 2 hours prior                       | 2 Hours Post           |
| <b>Antiplatelet Agents</b>  |                 |  |                        |
| ASA   | No              |  |                        |
| Clopidogrel (Plavix)  | No              |  |                        |
| Prasugrel (Effient)   | No              |  |                        |
| Triclopidine (Ticlid)   | No              |  |                        |
| <b>Glycoprotein IIb/IIIa inhibitors</b>                                     |                 |  |                        |
| Abciximab (ReoPro)  | Yes             | Hold 12-24 hrs pre                       | Day after Procedure    |
| Eptifibatide (Integrilin)   | Yes             | Hold immediately pre                     |                        |
| Tirofiban (Aggrastat)   | Yes             | Hold immediately pre                     |                        |
| <b>Factor Xa Inhibitors</b>   |                 |  |                        |
| Rivaroxaban (Xarelto)   | Yes             | eGFR>30 Hold 24hrs<br>eGFR<30 Hold 48hrs | Day after Procedure    |
| Apixaban (Eliquis)  | Yes             | eGFR>30 Hold 24hrs<br>eGFR<30 Hold 48hrs | Day after Procedure    |
| Fondaparinux (Arixtra)  | No              |  |                        |
| <b>Direct Thrombin Inhibitors</b>   |                 |  |                        |
| Argatroban  | No              |  |                        |
| Dabigatran (Pradaxa)  | No              |  |                        |
| Bivalirudin (Angiomax)  | No              |  |                        |
| <b>NSAIDS</b>   |                 |  |                        |
| <b>Short acting:</b> Ibuprofen, Diclofenac, Ketoprofen, Indomethacin        | No              |  |                        |
| <b>Intermediate Acting:</b> Naproxen, Sulindac, Diflunisal, Celecoxib       | No              |  |                        |
| <b>Long Acting:</b> Meloxicam, Nabumetone, Piroxicam                        | No              |  |                        |

**VASCULAR**

- Dialysis Line exchanges
- Venography
- Central Line Removal
- IVC filter placement
- PICC

**NON-VASCULAR**

- Catheter exchange (Abscess, Biliary, Nephrostomy)
- Thoracentesis
- Paracentesis
- Superficial Drainage

**SUPERFICIAL BIOPSY / ASPIRATION**

- Breast
- Lymph Node
- Extremities
- Thyroid

**THRESHOLDS FOR TREATMENT**

- INR < 1.5
- PTT: No consensus
- PLT: >50,000

**Anticoagulation Management Guidelines for Patients having *ELECTIVE* Invasive Procedures in Diagnostic Imaging**

| <b>MODERATE RISK</b>   |   |   |   |                               |  |
|--|---|---|---|-------------------------------|--|
| <b>MODERATE RISK PROCEDURES</b>  | <b>MEDICATION</b>   | <b>DISCONTINUE Y/N</b>                        | <b>STOP RECOMMENDATION</b>  | <b>RESUME ANTICOAGULATION</b> |  |
| <b>VASCULAR</b> <ul style="list-style-type: none"> <li>Angiography (Arterial Intervention up to 7F)</li> <li>Venous Intervention (Plasty, Stent, Thrombolysis)</li> <li>Chemoembolization</li> <li>Uterine Fibroid Embolization</li> <li>Varicocele Embolization</li> <li>Transjugular Liver Biopsy</li> <li>Tunneled CVC/Port/Hickman</li> </ul>  | <b>Conventional Agents</b>  |   |   |                               |  |
|  | Warfarin (Coumadin)   | Yes   | Hold 5 Days pre<br><b>recheck INR</b>                                     | Day after Procedure           |  |
|  | <b>LMWH:</b> Fragmin=Dalteparin<br>Lovenox=Enoxaparin<br>Innohep=Tinzaparin   | Yes   | Hold 12 hrs prior   | Day after Procedure           |  |
|  | Heparin (Unfractionated)  | Yes   | Hold 2-4 hours prior  | 4-6 Hours Post                |  |
|  | <b>Antiplatelet Agents</b>  |   |   |                               |  |
|  | ASA   | No  |   |                               |  |
|  | Clopidogrel (Plavix)  | Yes   | Hold 5 days pre   | Day after Procedure           |  |
|  | Prasugrel (Effient)   | Yes   | Hold 5 days pre   | Day after Procedure           |  |
|  | Triclopidine (Ticlid)   | Yes   | Hold 7 days pre   | Day after Procedure           |  |
|  | <b>Glycoprotein IIb/IIIa inhibitors</b>   |   |   |                               |  |
|  | Abciximab (ReoPro)  | Yes   | Hold 24 hrs pre   | Day after Procedure           |  |
|  | Eptifibatide (Integrilin)   | Yes   | Hold 4hrs pre   |                               |  |
|  | Tirofiban (Aggrastat)   | Yes   | Hold 4hrs pre   |                               |  |
|  | <b>Factor Xa Inhibitors</b>   |   |   |                               |  |
|  | Rivaroxaban (Xarelto)   | Yes   | eGFR>30 Hold 48hrs<br>eGFR<30 Hold 4days                                  | Day after Procedure           |  |
| Apixaban (Eliquis)   | Yes   | eGFR>30 Hold 48hrs<br>eGFR<30 Hold 4days      | Day after Procedure   |                               |  |
| Fondaparinux (Arixtra)   | Yes   | eGFR>50 Hold 2-3days<br>eGFR <50 Hold 3-5days | Day after Procedure   |                               |  |
| <b>NON-VASCULAR</b><br><b>Abdominal/Thoracic Procedures</b> <ul style="list-style-type: none"> <li>Abscess Drain: Intraabdominal, chest wall, pleural or retroperitoneal</li> <li>Solid organ core biopsy (Not Renal)</li> <li>Gastrostomy/Gastrojejunostomy</li> <li>Percutaneous Cholecystostomy</li> <li>Lung Biopsy</li> <li>Uncomplicated RFA</li> <li>Peritoneal Dialysis Catheter Insert</li> </ul><br><b>MSK/Spine Procedures</b> <ul style="list-style-type: none"> <li>Lumbar puncture, facet block, nerve root block</li> <li>Vertebroplasty/Kyphoplasty</li> <li>Extremity/MSK/Spine biopsy</li> </ul> | <b>Direct Thrombin Inhibitors</b>   |   |   |                               |  |
|  | Argatroban  | Yes   | Hold 4hrs pre   | Day after Procedure           |  |
|  | Dabigatran (Pradaxa)  | Yes   | eGFR >50 Hold 2-4days<br>eGFR 30-50 Hold 4days<br>eGFR <30 Hold for 5days | Day after Procedure           |  |
|  | Bivalirudin (Angiomax)  | Yes   | Hold 3-5 hrs pre  | Day after Procedure           |  |
|  | <b>NSAIDS</b>   |   |   |                               |  |
|  | <b>Short acting:</b> Ibuprofen.....   | No  |   |                               |  |
|  | <b>Intermediate Acting:</b> Naproxen...,  | No  |   |                               |  |
|  | <b>Long Acting:</b> Meloxicam,.... See above for others   | No  |   |                               |  |
|  | <b>THRESHOLDS FOR TREATMENT</b> <ul style="list-style-type: none"> <li>INR&lt; 1.5</li> <li>PTT: try for &lt;50s (N=25-35s)</li> <li>PLT: &gt;50,000</li> </ul> |   |   |                               |  |
|  |   | Bloodwork within 30days for outpatient        |   |                               |  |

**Anticoagulation Management Guidelines for Patients having *ELECTIVE* Invasive Procedures in Diagnostic Imaging**

**HIGH RISK**

**HIGH RISK PROCEDURES**

| MEDICATION  | DISCONTINUE Y/N | STOP RECOMMENDATION   | RESUME ANTICOAGULATION              |
|---|-----------------|---|-------------------------------------|
| <b>Conventional Agents</b>  |                 |   |                                     |
| Warfarin (Coumadin)   | Yes             | Hold 5 Days pre<br><b>recheck INR</b>                                     | Day after Procedure                 |
| <b>LMWH:</b> Fragmin=Dalteparin<br>Lovenox=Enoxaparin<br>Innohep=Tinzaparin | Yes             | Hold 2 doses or 24 hrs pre procedure                                      | Day after Procedure                 |
| Heparin (Unfractionated)  | Yes             | Hold 4 hours prior  | 12 Hours Post                       |
| <b>Antiplatelet Agents</b>  |                 |   |                                     |
| ASA   | Yes             | Hold 5 days pre   | Day after Procedure                 |
| Clopidogrel (Plavix)  | Yes             | Hold 5 days pre   | Day after Procedure                 |
| Prasugrel (Effient)   | Yes             | Hold 5 days pre   | Day after Procedure                 |
| Triclopidine (Ticlid)   | Yes             | Hold 7 days pre   | Day after Procedure                 |
| <b>Glycoprotein IIb/IIIa inhibitors</b>                                     |                 |   |                                     |
| Abciximab (ReoPro)  | Yes             | Hold 24 hrs pre   | Day after Procedure                 |
| Eptifibatide (Integrilin)   | Yes             | Hold 4hrs pre   |                                     |
| Tirofiban (Aggrastat)   | Yes             | Hold 4hrs pre   |                                     |
| <b>Factor Xa Inhibitors</b>   |                 |   |                                     |
| Rivaroxaban (Xarelto)   | Yes             | eGFR>30 Hold 48hrs<br>eGFR<30 Hold 4days                                  | 2 <sup>nd</sup> Day after Procedure |
| Apixaban (Eliquis)  | Yes             | eGFR>30 Hold 48hrs<br>eGFR<30 Hold 4days                                  | 2 <sup>nd</sup> Day after Procedure |
| Fondaparinux (Arixtra)  | Yes             | eGFR>50 Hold 2-3days<br>eGFR <50 Hold 3-5days                             | 2 <sup>nd</sup> Day after Procedure |
| <b>Direct Thrombin Inhibitors</b>   |                 |   |                                     |
| Argatroban  | Yes             | Hold 4hrs pre   | 2 <sup>nd</sup> Day after Procedure |
| Dabigatran (Pradaxa)  | Yes             | eGFR >50 Hold 2-4days<br>eGFR 30-50 Hold 4days<br>eGFR <30 Hold for 5days | 2 <sup>nd</sup> Day after Procedure |
| Bivalirudin (Angiomax)  | Yes             | Hold 3-5 hrs pre  | 2 <sup>nd</sup> Day after Procedure |
| <b>NSAIDS</b>   |                 |   |                                     |
| <b>Short acting:</b> Ibuprofen.....   | Yes             | Hold 24 hrs pre   | Day after Procedure                 |
| <b>Intermediate Acting:</b> Naproxen....,                                   | Yes             | Hold 2-3 days pre   | Day after Procedure                 |
| <b>Long Acting:</b> Meloxicam,.... See above for others                     | Yes             | Hold 10 days pre  | Day after Procedure                 |

**VASCULAR**

- Angiography Arterial Intervention > 7F
- TIPS

**NON-VASCULAR**

- Biliary Interventions (New Tract)
- Nephrostomy Insert
- Renal Biopsy
- RFA: complicated

**THRESHOLDS FOR TREATMENT**

- INR < 1.5
- PTT: try for <43s (N=25-35s)
- PLT: >50,000

Bloodwork within:  
72hrs Inpatients  
14days Outpatients

**HIGH RISK**

**MODERATE RISK**

**LOW RISK**

**Version 2.0 Effective September 1 2015  
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**References:**

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- 2. Journal of Vascular And Interventional Radiology 2009; 20:S240-S249 – Consensus Guidelines for Periprocedural management of Coagulation Status and Hemostasis Risk in Percutaneous Image-guided Interventions**
- 3. Canadian Journal of Cardiology 2011; 27:S1-S59 – The Use of Antiplatelet Therapy in the Outpatient Setting: Canadian Cardiovascular Society Guidelines**
- 4. O'Connor et al. Coagulation Concepts Update AJR, 2009**