

Spectrum Radiology
Coagulation Parameters – March, 2010
EMMC Guidelines for Invasive Procedures

The following procedures require: Platelet count: greater than or equal to 35,000
INR: less than or equal to 1.7

- Epidural placement/manipulation of neuraxis
- Myelograms
- Lumbar punctures
- Cisternograms
- Nephrostomy/Percutaneous Biliary Drainage
- Arteriotomy

Kidney Biopsy

- Platelet count: greater than or equal to 35,000
- INR: less than or equal to 1.7

Thoracentesis, Liver Biopsy, Abscess Drainage or other Invasive Procedures/Biopsies

- Platelet count: greater than or equal to 25,000
- INR: less than or equal to 2.0

Paracentesis

- Platelet count: greater than or equal to 25,000
- INR: less than or equal to 3.0

Superficial Fine Needle Aspiration (FNA), Thyroid Biopsy

- 20 g needle or smaller
- No labs required
- Platelet count: any
- INR: any

These are not all inclusive. Check with radiologist for specific exams not listed above, or for patients with specific coagulation issues.

Table 3 Interventional Radiology Procedures

Low risk of bleeding, easily detected and controllable	
Vascular procedures	Non-vascular procedures
Dialysis access interventions	Drainage catheter exchange (biliary, nephrostomy, abscess catheter)
Venography	Thoracentesis
Central line removal	Paracentesis
IVC filter placement	Superficial aspiration biopsy: thyroid, superficial lymph node (excludes intrathoracic or intraabdominal sites)
PICC placement	Superficial abscess drainage
Moderate risk of bleeding	
Vascular procedures	Non-vascular procedures
Angiography, arterial intervention with access size up to 7 F	Intraabdominal, chest wall, or retroperitoneal abscess drainage or biopsy
Venous interventions	Lung biopsy
Chemoembolization	Transabdominal liver biopsy (core needle)
Uterine fibroid embolization	Percutaneous cholecystostomy
Transjugular liver biopsy	Gastrostomy tube, initial placement
Tunneled central venous catheter	Radiofrequency ablation: straightforward
Subcutaneous port device	Spine procedures (vertebroplasty, kyphoplasty, lumbar puncture, epidural injection, facet block)
High bleeding risk, difficult to detect or control	
Vascular procedures	Non-vascular procedures
TIPS	Renal biopsy
	Biliary interventions (new tract)
	Nephrostomy tube placement
	Radiofrequency ablation; complex

Medical Imaging Guidelines for Antithrombotic Medications

(Re-formatted from references: EMMC Peri – Operative anticoagulation Quick Guide/ EMMC Peri-Procedural Guideline for Use of Antithrombotic Agents)

These guidelines will replace prior Medical Imaging Nursing Policy 16.01 Anticoagulation/Antiplatelets Prior to Interventional Procedures

Anticoagulant	Low Risk	Medium Risk	High Risk
Warfarin	(+)/-	Stop 5 days	Stop 5 days
Heparin (Prophylactic)	OK	OK	OK
Heparin (Therapeutic)	(+)/-	Stop 4-6 hrs	Stop 4-6 hrs
Enoxaparin(Prophylactic)	(+)/-	Stop 12 h	Stop 12h
Enoxaparin(Therapeutic)	(+)/-	Stop 24 h	Stop 24 h
Others:			
Apixaban(Eliquis)	(+)/-	See Individual Drug Data on EMMC Peri-Operative	
Dabigatran(Pradaxa)	(+)/-		
Edoxaban(Savaysa)	(+)/-		
Rivaroxaban(Xarelto)	(+)/-		

Antiplatelet	Low Risk	Medium Risk	High Risk
Aspirin	OK	OK	Stop 5 days
Clopidogrel(Plavix)	(+)/-	Stop 5 days	Stop 5 days

(+)/- = No absolutes- Approving Radiologist to review patient data to determine benefits of procedure vs. individual risk

This document provides guidance for elective procedures. For urgent or emergent procedures, consult one of the following:

- EMMC Guide on Management of Anticoagulant and Antiplatelet Agent Associated Bleeding Complications in Adults

EMMC Peri-operative Anticoagulation Quick Guide

WARFARIN

Assess INR at least 7 days prior to surgery to allow for planning of the perioperative management

Warfarin may be continued during procedures where bleeding risk is low:

- Simple dental procedures (including extractions) if there is co-administration of oral or topical hemostat (oral rinse) such as tranexamic acid. If no hemostatic agent is co-administered, then hold warfarin 2-3 days before the procedure.
- Cataract surgery
- Diagnostic or screening colonoscopy
- Some cutaneous surgeries

Check INR at 24 hours prior to surgical procedure to ensure that INR goal has been attained.

Drug	Pre-procedure INR	Pre-procedure plan	Post procedure plan
Warfarin (Coumadin®, Jantoven®)	2-3	Stop 5 days before procedure	Restart within 24 hours after surgical procedure or on postoperative day 1 if hemostasis is achieved
	3 – 4.5	Stop 6 days before procedure	
	Greater than 4.5	Stop 6 – 7 days before procedure. Consider rechecking INR after 2-3 days of held doses. If indicated, consider phytonadione administration.	

Warfarin: to bridge or not to bridge...

Recent studies in patients with atrial fibrillation have demonstrated that **bridging warfarin** interruption with parenteral anticoagulant does not reduce the risk of perioperative thromboembolism. However, patients who received parenteral anticoagulation had a significantly higher risk of bleeding complications than did the patients who were not bridged. Based on this information, **it is no longer recommended to bridge patients who have low or moderate risk of thromboembolism**.

- Periprocedural bridging with antithrombotic agents should be reserved for high thrombotic risk patients.
- The decision to bridge or not to bridge for elective procedures in a high risk patient will be made after consultation between the surgeon, PCP and cardiologist or other relevant specialist.

Risk	High: periprocedural bridging is advised
Mechanical heart valve	Any mechanical mitral valve Older mechanical valve model (caged ball or tilting disc) in the mitral or aortic position. Recently placed mechanical valve (<3 months) in the mitral or aortic position Recent stroke or TIA (within 3 months)
Bioprosthetic valve	Placement within 3 months
Atrial fibrillation	With mechanical heart valve in the mitral or aortic position With recent stroke or TIA (within 3 months)
Venous thromboembolism	VTE with previous 3 months

ORAL ANTICOAGULANTS

Assess renal function at least 7 days before surgery to allow for planning of perioperative management.

Drug	Pre-procedure	Stop prior to procedure	
	Scr=serum creatinine CLcr=creatinine clearance	Minor surgery or standard bleed risk surgery	Major surgery or high bleed risk surgery
Apixaban (Eliquis®) <i>Factor Xa inhibitor</i>	Scr less than 1.5mg/dL	24 hours	48 hours
	Scr= 1.5mg/dL or greater	48 hours	72 hours
Dabigatran(Pradaxa®) <i>Direct thrombin inhibitor</i>	Clcr=50mL/min or greater	1 to 2 days	2 to 4 days
	Clcr less than 50mL/min	3 to 5 days	5 days or more
Edoxaban (Savaysa®) <i>Factor Xa inhibitor</i>	Clcr=50mL/min or greater	24 hours	48 hours
	Clcr less than 50mL/min	48 hours	72 hours
Rivaroxaban (Xarelto®) <i>Factor Xa inhibitor</i>	Clcr greater than 30mL/min	24 hour	48 hours
	Clcr =30mL/min or less	48 hours	72 hours

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PARENTERAL ANTICOAGULANTS

Medication	Pre-procedure	Any bleed risk surgery
	Clcr=creatinine clearance	Stop prior to procedure
Argatroban <i>Direct thrombin inhibitor</i>	Normal hepatic function	3 hour
	Child Pugh score greater than 6	9 hours
Bivalirudin <i>Direct thrombin inhibitor</i>	CLcr=30mL/min or greater	1.5 hours
	Clcr less than 30mL/min	3 hours
Enoxaparin (Prophylactic dosing) <i>Low Molecular Weight Heparin</i>	30mg subcutaneously q12h	12 hours
	40mg subcutaneously daily	12 hours
Enoxaparin (Therapeutic dosing) <i>Low Molecular Weight Heparin</i>	1mg/kg/dose subcutaneously q12h	24 hours
	1.5mg/kg/dose subcutaneously daily	24 hours
Fondaparinux <i>Factor Xa inhibitor</i>	CLcr= 50mL/min or greater	3 days
	Clcr less than 50mL/min	5 days
Unfractionated heparin Prophylactic dosing	5000 units subcutaneously q8h or q12h	May give before the procedure
Unfractionated heparin Therapeutic dosing	Infusion per protocol	4 to 6 hours

ANTIPLATELET AGENTS

Assess use at least 7 days prior to procedure to allow for adequate hold time

For patients with coronary artery stent requiring surgery it is recommended to **defer surgery** for at least 6 weeks for **bare metal stent** and at least 6 months for **drug-eluting stent**. If any patient is on **dual antiplatelet therapy**, discussion with the cardiologist regarding perioperative management is indicated.

Drug	Stop before procedure	Comments
Aspirin Low cardiovascular event risk	7 to 10 days (high bleeding risk only)	Continue for minor procedures, history of cardiac stents, and most non-cardiac surgeries (unless high bleeding risk).
Aspirin High cardiovascular event risk	Continue	
Aspirin/Dipyridamole (Aggrenox®)	7 to 10 days	Combination antiplatelet : to reduce risk of stroke in patients with history of prior TIA/stroke due to thrombosis
Cilostazol (Pletal®)	1 to 2 days	for intermittent claudication
Clopidogrel (Plavix®)	5 days	Platelet aggregation inhibitor: reduction of atherosclerotic events in: recent MI, CVA, PAD, non-STEMI, ACS or STEMI
Prasugrel (Effient®)	5 to 7 days	
Ticagrelor (Brillinta®)	5 days	
Vorapaxar (Zontivity®)	More than 30 days Consult cardiologist	Protease-activated receptor-1 (PAR-1) antagonist used with ASA +/- clopidogrel to reduce the risk of thrombotic events in MI or PAD.

- This document provides guidance for elective procedures. For urgent or emergent procedures, consult the **"EMMC Guide on Management of Anticoagulant and Antiplatelet Agent Associated Bleeding Complications in Adults"** <http://intranet.emhs.org/EMMC-Portals/EMMC-Portals/Patient-Blood-and-Transfusion/Sub-Menu/Education-Resources/Department-Documents/Education-Resources/Physician-Education-Materials/EMMC-Guide-on-Management-of-Anticoagulant-and-Anti.aspx>
- For more detailed drug information, call EMMC Pharmacy 973-8286.
- **Patient Blood Management** (973-4928 or 973-4851) involvement is available as needed for procedures with a high risk of bleeding and patients with pre- and post-op anemia.