

Anticoagulants	Mechanism of Action	Half life	Monitoring lab	Reversal Agent	Pre-procedure Hold Times		
					**Category I procedures	**Category II procedures	**Category III procedures
GP IIB/IIIA Inhibitors							
Abeiximab (ReoPro)	GP IIB/IIIA Inhibitor	8-12 hrs	None	Platelets and desmopressin may help. ¹	12-24 hrs*	24 hrs*	24 hrs*
Eptifibatid (Integrilin)	GP IIB/IIIA Inhibitor	2.5 hrs	None	Desmopressin may help. Platelet transfusion ineffective until med is cleared from the blood. ¹	Withhold immediately before procedure.	4 hrs	4 hrs
Tirofiban (Aggrastat)	GP IIB/IIIA Inhibitor	2 hrs	None	Desmopressin may help. Platelet transfusion ineffective until med is cleared from the blood. ¹	Withhold immediately before procedure.	4 hrs	4 hrs
Direct Thombin Inhibitors							
Argatroban (Novastan)	Direct Thombin Inhibitor	0.75 hrs	aPTT	Recombinant factor VIIa, desmopressin. Prothrombin complex concentrates may be considered. ¹	Do not withhold	4 hrs	4 hrs
Bivalirudin (Angiomax)	Direct Thombin Inhibitor	0.5 hrs	aPTT	Recombinant factor VIIa and prothrombin complex concentrates induce partial reversal. ¹	Do not withhold	2-3 days if GFR > 50 3-5 days if GFR < 50	2-3 days if GFR > 50 3-5 days if GFR < 50
Dabigatran (Pradaxa) ⁴	Direct Thombin Inhibitor	14 hrs	PTT, TT, EC	(Potentially, Idarucizumab). Recombinant factor VIIa, prothrombin complex concentrates, factors II, IX, or X experimental evidence for treating overdose.	Do not withhold	2-3 days if GFR > 50 3-5 days if GFR < 50	2-3 days if GFR > 50 3-5 days if GFR < 50
Lepirudin (Refludan)	Direct Thombin Inhibitor	1.3 hrs	aPTT	Recombinant factor VIIa, desmopressin, prothrombin complex concentrates may be considered. ¹	Do not withhold	4 hrs	4 hrs
Antithrombin Activators							
Heparin	Inhibits factors IXa, Xa, XIa, XIIa	1.5 hrs	aPTT	Protamine.	No consensus	No consensus	2-5 hrs
Enoxaprin (Lovenox)	Preferentially inhibits factor Xa over factor IIA	4.5-7 hrs	Anti-Xa	Protamine.	12 hrs	12 hrs	24 hrs
Dalteparin (Fragmin)	Preferentially inhibits factor Xa over factor IIA	2-5 hrs	Anti-Xa	Protamine.	No data available	No data available	No data available
Fondaparinux (Arixtra)	Specifically inhibits factor Xa	17 hrs	Anti-Xa	Recombinant factor VIIa, desmopressin, prothrombin complex concentrates may be considered. ¹	Do not withhold	2-3 days if GFR > 50 3-5 days if GFR < 50	2-3 days if GFR > 50 3-5 days if GFR < 50
Antiplatelets							
Aspirin	Irreversible inhibitor of COX	3-10 hrs ²	None	Platelets and desmopressin may help. ¹	Do not withhold	Do not withhold	5 days
Aspirin + Dipyridamole (Aggrenox)	Decrease platelet aggregation- inhibits mult pro-coagulant paths	10-12 hrs	None	Platelets may help. Xanthine derivatives can reverse Dipyridamole overdose. ¹	Do not withhold	Do not withhold	5 days
Cilostazol (Pletal)	Decrease platelet aggregation by inhibiting cAMP degradation	11-13 hrs	None	None ¹	No data available	No data available	No data available
Ticlopidine (Ticlid)	Irreversibly blocks ADP receptors on platelets	13 hrs	None	Platelets and desmopressin may help. ¹	7 days	7 days	7 days
Clopidogrel (Plavix)	Irreversibly blocks ADP receptors on platelets	6 hrs	None	Platelets and desmopressin may help. ¹	5 days	5 days	5 days
Prasugrel (Effient)	Irreversibly blocks ADP receptors on platelets	2-15 hrs	None	Platelet transfusion may help. ¹	5 days	5 days	5 days
Vitamin K Antagonist							
Warfarin (Coumadin, Jantoven, Marevan, Uniwafarin)	Inhibits synthesis of Vitamin K dependent clotting factors	40 hrs	INR	Vitamin K and FFP	5 days	5 days	5 days
Factor Xa Inhibitors (the "xabans")							
Rivaroxaban (Xarelto) ⁴	Factor Xa inhibitor	7 to 11 hrs	Anti-Xa, PT, aPTT	(Potentially, Andexanet). Currently None ¹	Do not withhold	3 days	3 days
Apixaban (Eliquis) ⁴	Factor Xa inhibitor	12 hrs	Anti-Fxa	(Potentially, Andexanet). Currently None ¹	Do not withhold	3 days	3 days
Edoxaban (Savasya, Lixiana) ⁴	Factor Xa inhibitor	9 to 11 hrs	PT, aPTT	(Potentially, Andexanet). Currently None ¹	Do not withhold	3 days	3 days
NSAIDs (short acting)							
Ibuprofen (Advil, Motrin), Diclofenac (Voltaren, Cambia), Ketoprofen, Indomethacin (Indocin)	COX inhibitors	2-6 hrs	None	None ¹	Do not withhold	Do not withhold	24 hrs
Ketorolac (Toradol)	COX inhibitor	5-7 hrs	None	None ¹	Do not withhold	Do not withhold	24 hrs
NSAIDs (intermediate acting)							
Naproxen (Naprosyn), Sulindac (Clinoril), Diflunisal, Celecoxib (Celebrex)	COX inhibitors	7-15 hrs	None	None ¹	Do not withhold	Do not withhold	2-3 days
NSAIDs (long acting)							
Meloxicam (Mobic), Nabumetone (Relafen), Piroxicam (Feldene)	COX inhibitor	>20 hrs	None	None ¹	Do not withhold	Do not withhold	10-12 days

¹ No specific reversal agent available

² Half life is dose dependent

³ No peer reviewed source available, however multiple internet sources stated this number

⁴ Non-Wafarin (Non-Vit K dependent) Oral anticoagulant Drug

*Platelets function returns to 50% of baseline at 24 hours.

**See categorization on sheet #2 'risk category'

As outlined in the SIR Consensus Documents "Consensus Guidelines for Periprocedural Mgmt of Coagulation Status and Hemostasis Risk in Percutaneous Image-Guided Interventions" and "Addendum of Newer Anticoagulants to the SIR Consensus Guideline"

Category 1 - Low Risk of Bleeding, Easy to detect	Category 2 - Moderate Risk of Bleeding	Category 3 - High Risk of Bleed, Difficult to detect
Procedures		
Nontunneled venous catheters Dialysis access interventions Central line placement Venography Catheter exchange Thoracentesis Paracentesis Thyroid biopsy Joint aspiration/injection Superficial aspiration, drainage, and/or biopsy (excluding intrathoracic or intraabdominal site)	Angiography (arterial intervention with access size up to 7 Fr) Venous interventions Chemoembolization/radioembolization Uterine fibroid embolization TJ liver biopsy Tunneled venous catheter Subcutaneous port device placement Abscess drainage Biopsy (excluding superficial and renal) Percutaneous cholecystostomy Enteric tube placement, initial Spinal procedures	TIPS Renal biopsy RFA Nephrostomy tube placement Biliary intervention (new tract)
Tests		
INR: recommended aPTT: recommended Platelet count: not routinely recommended Hematocrit: not routinely recommended	INR: recommended aPTT: recommended Platelet count: recommended Hematocrit: not routinely recommended	INR: recommended aPTT: recommended Platelet count: recommended Hematocrit: not routinely recommended
Thresholds		
INR: correct to <2.0 Platelets: <50,000 aPTT: no consensus	INR: correct to <1.5 Platelets: <50,000 aPTT: no consensus	INR: correct to <1.5 Platelets: <50,000 aPTT: correct so value is <1.5x control