

Overview of Antithrombotic Agents							
Agent	Route	Mechanism	Recommended Interval between Last Dose and Procedure	Approved Indications	Laboratory Monitoring	Reversal Agents (for severe bleeding)	Comments
<b>Anticogulant agents</b>							
Warfarin	Oral	Inhibition of vit K-dependent factors II,VII, IX and X and proteins C and S	INR < 1.5 in 5 days	VTE Afib	INR	Vit K, FFP	
UFHeparin	Intravenous or subcutaneous	Antithrombin activation (inhibition of factors IIa, IXa, Xa, XIa, and XIIa)	iv, 2-6 hr, depending on dose; subcutaneous, 12-24 hr, depending on dose	Prophylaxis Treatment	aPTT	Protamine sulfate	
LMWH	Subcutaneous	Antithrombin activation (inhibition of factor Xa and, to a lesser extent, factor IIa)	24 hr	Prophylaxis Treatment	Anti-factor Xa antibody levels in selected patients	Protamine sulfate (only partially reverses)	Elimination is impaired in chronic kidney disease
Fondaparinux (Arixtra, GlaxoSmithKline)	Subcutaneous	Antithrombin activation (factor Xa inhibitor)	36-48 hr	Prophylaxis Treatment	None, but consider fondaparinux-specific anti-Xa assays	None. Consider recombinant factor VIIa only in high-risk patients with major bleeding	Elimination is impaired in patients with chronic kidney disease
Dabigatran (Pradaxa)	Oral	Direct thrombin inhibitor	1 or 2 days with creatinine clearance rate of $\geq 50$ ml/min; 3-5 days with creatinine clearance rate of <50 ml/min	Nonvalvular atrial fibrillation	aPTT or thrombin time can be used to rule out substantial residual effect	None. Consider factor VIII inhibitor bypass activity or recombinant activated factor VIIa, hemodialysis	Consider withholding for longer period before high-risk bleeding procedures
Rivaroxaban (Xarelto)	Oral	Direct factor Xa inhibitor	$\geq 1$ day when renal function is normal; 2 days CRCL 60-90 ml/min; 3 days CRCL 30-59 ml/min; and 4 days with CRCL 15-29 ml/min	Prophylaxis nonvalvular atrial fibrillation, and treatment of VTE	Prothrombin time or anti-factor Xa antibody; normal value	None, but consider PCCs	Consider withholding for longer period before high-risk bleeding procedures
Apixaban (Eliquis)	Oral	Direct factor Xa inhibitor	1 or 2 days with CRCL >60 ml/min; 3 days with CRCL 50-59 ml/min; and 5 days with CRCL of <30-49 ml/min	Nonvalvular atrial fibrillation	Anti-Xa antibody	None, but consider charcoal hemoperfusion or PCCs, particularly 4-factor	
Desirudin (Iprivask)	Subcutaneous	Direct thrombin inhibitor	2 hr	Prophylaxis	aPTT, thrombin time, or ecarin clotting time	None	

**Antiplatelet agents**

Aspirin	Oral	Cyclooxygenase inhibitor (irreversible effect)	7-10 days	Multiple conditions	None, but consider platelet-function testing	Platelet transfusion	Platelet turnover for repletion
Aspirin and dipyridamole (Aggrenox)	Oral	Phosphodiesterase inhibitor	7-10 days	Prophylaxis for ischemic stroke	None, but consider platelet-function testing	Platelet transfusion	
Cilostazol (Pletal)	Oral	Phosphodiesterase inhibitor	2 days	Intermittent claudication	None	Platelet transfusion	
Thienopyridine agents (clopidogrel (Plavix), ticlopidine (Ticlid), prasugrel (Effient) and ticagrelor (Brilinta)	Oral	ADP receptor antagonist	5 days (clopidogrel and ticagrelor), 7 days (prasugrel), or 10-14 days (ticlopidine)	Acute coronary syndrome, artery and stent thrombotic cerebrovascular accident, treatment of peripheral vascular disease, TIA	Non, but consider platelet-function testing	Consider platelet transfusion, but efficacy may be limited	