

Anticoagulants and Reversal

Generic Name	Trade Name	Primary Mechanism	Available tests	Reversal
Abciximab	REOPRO	Antiplatelet	TEG	Platelets +/- DDAVP
Anagrelide	AGRYLIN	Antiplatelet	TEG	Platelets
Apixaban	ELIQUIS	Factor Xa inhibitor	TEG	PCC or ANDEXXA
Argatroban	ACOVA	Thrombin inhibitor	Thrombin time, ACT	Partial reversal w/PCC
Betrixaban	BEVYXXA	Factor Xa inhibitor		
Bivalrudin	ANGIOMAX	Thrombin inhibitor	Thrombin time, ACT	Partial reversal w/PCC
Cilostazol	PLETAL	Antiplatelet	TEG	Platelets +/- DDAVP
Clopidogrel	PLAVIX	Antiplatelet P2Y12 irreversibly blocked	TEG	Platelets +/- DDAVP
Dabigatran	PRADAXA	Thrombin inhibitor	Thrombin time, ACT	PRAXBIND, dialysis (elimination is all renal)
Dalteparin	FRAGMIN	ATIII activation	Anti Factor Xa	Part reversal w/protamine
Desirudin	REVASC IPRIVAK	Thrombin inhibitor	Thrombin time, ACT	Partial reversal w/PCC
Edoxaban	SAVAYSA	Factor Xa inhibitor	TEG	PCC
Enoxaparin	LOVENOX	ATIII activation	Anti Factor Xa	Part reversal w/protamine
Eptifibatide	INTEGRILIN	Antiplatelet	TEG	Platelets
Fondaparinux	ARIXTRA	Factor Xa inhibitor	TEG	PCC
Heparin		ATIII activation	PTT, ACT	Protamine
Lepirudin	RELFUDAN	Thrombin inhibitor	Thrombin time, ACT	Partial reversal w/PCC
Prasugrel	EFFIENT	Antiplatelet P2Y12 irreversibly blocked	TEG	Platelets
Retepase	RETAVASE	Thrombolytic	PTT, PT, fibrinogen	Cryo +/- Amicar or TXA
Rivaroxaban	XARELTO	Factor Xa inhibitor	TEG	PCC or ANDEXXA
Streptokinase		Thrombolytic	PTT, PT, fibrinogen	Cryo +/- Amicar or TXA
Tenecteplase	TNKase	Thrombolytic	PTT, PT, fibrinogen	Cryo +/- Amicar or TXA
Ticagrelor	BRILINTA	Antiplatelet P2Y12 reversibly blocked	TEG	Platelets +/- DDAVP
Ticlopidine	TICLID	Antiplatelet	TEG	Platelets +/- DDAVP
Tinzaparin	INNOHEP	ATIII activation	TEG	Part reversal w/protamine
Tirofiban	AGGRASTAT	Antiplatelet	TEG	Platelets +/- DDAVP
tPA	ALTEPLASE	Thrombolytic	PTT, PT, fibrinogen	Cryo +/- Amicar or TXA
Urokinase	ABBOKINASE	Thrombolytic	PTT, PT, fibrinogen	Cryo +/- Amicar or TXA
Warfarin	COUMADIN	Vit K dependent factor inhibitor	PT, INR	Vit K, FFP or PCC

Reversal of Coumadin:

- Non-urgent – Vitamin K (takes 12-24 hrs), or do nothing and wait 5 days
- Urgent – FFP or PPC (Kcentra, see below). PPC more desirable if need to avoid fluid administration

Reversal of direct oral inhibitors of thrombin and Factor Xa:

- FFP can help but will not fully reverse their effect. PT/PTT are not reliable assays of their effects. However, since **their half-lives are much shorter than Coumadin**, reversal is only needed in the most emergent of circumstances, e.g. craniotomy for an acute intracranial bleed
- Their short duration of action makes bridging therapy with SQ Lovenox or heparin unnecessary
- Assuming normal renal function, normal hemostasis should return within 24 hrs
- Praxbind (idarucizumab) is specifically for the reversal of Pradaxa (dabigatran). Dose - 5 g IV bolus. Since Pradaxa is renally excreted, consider Praxbind if surgery within 3 days of last dose in patients with CRF
- Andexxa (andexanet alfa) is specifically for the reversal of Xarelto and Eliquis
- Kcentra (PCC) will reverse Factor Xa inhibitors, but does not fully reverse thrombin inhibitors

PPC = Four-Factor Prothrombin Complex Concentrate. Kcentra is an FDA-approved form of PPC. Kcentra:

- Contains factors II, IX, X, VII
- More effective than FFP
- Freeze-dried powder. No infection or transfusion risks
- Kcentra contains a small amount of heparin, therefore history of HIT is a contraindication
- Will reverse Coumadin in < 30 min
- Will reverse Factor Xa inhibitors
- Will not reverse heparin or low-molecular wt heparinoids such as Lovenox
- Only partially reverses thrombin inhibitors
- Dose: 35u/kg for Coumadin; 50u/kg for Factor Xa inhibitors
- Very expensive

Protamine:

- See cardiothoracic anesthesia
- Reverses unfractionated heparin but will only partially reverse low-molecular weight heparinoids (Lovenox and Fragmin)

Recombinant Factor VIIa:

- Immediately effective but not FDA approved for reversal
- Carries the risk of thrombotic complications