Recommendations for reversal of antithrombotic agents in patients with intracranial hemorrhage

**Consider Antithrombotic, Elimination, Antidote, Factor Replacement, Antifibrinolytics**

**Vitamin K antagonists (warfarin)** If INR > 1.3 then Vitamin K 10 mg IV, plus 3 or 4 factor PCC IV
(dosing based on weight, INR and PCC type) OR FFP 10-15 ml/kg IV if PCC not available

**Direct factor Xa inhibitors (apixaban, edoxaban, rivaroxaban):** activated charcoal (50 g) within 2 h of ingestion, activated PCC (FEIBA) 50 units/kg IV OR 4 factor PCC 50 units/kg IV

**Direct thrombin inhibitors (dabigatran):** Activated charcoal (50 g) within 2 h of ingestion, AND Activated PCC (FEIBA) 50 units/kg IV OR 4 factor PCC 50 units/kg IV. Idarucizumab 5 g IV (in two 2.5 g/50 mL vials) consider hemodialysis or idarucizumab redosing for refractory bleeding after initial administration if 1) dabigatran was taken with 3-5 half lives and NO evidence of renal insufficiency or 2) dabigatran was taken beyond 3-5 half lives WITH renal insufficiency

**For other DTIs (bivalirudin, desirudin):** Activated PCC (FEIBA) 50 units/kg IV OR 4 factor PCC 50 units/kg IV

**Unfractionated heparin:** Protamine 1 mg IV for every 100 units of heparin administered in the previous 2-3 h (up to 50 mg in a single dose)

**LMWH**

**Enoxaparin:** Dosed within 8 h: Protamine 1 mg IV per 1 mg enoxaparin (up to 50 mg in a single dose) Dosed within 8-12 h: Protamine 0.5 mg IV per 1 mg enoxaparin (up to 50 mg in a single dose) Minimal utility in reversal >12 h from dosing

**Dalteparin, Nadroparin and Tinzaparin:** Dosed within 3-5 half-lives of LMWH: Protamine 1 mg IV per 100 anti-Xa units of LMWH (up to 50 mg in a single dose) OR rFVIIa 90 mcg/kg IV if protamine is contraindicated

**Danaparoid:** rFVIIa 90 mcg/kg IV

**Pentasaccharides:** Activated PCC (FEIBA) 20 units/kg IV or rFVIIa 90 mcg/kg IV

**Thrombolytic agents (plasminogen activators):** Cryoprecipitate 10 units IV OR Antifibrinolytics (tranexamic acid 10-15 mg/kg IV over 20 min or e-aminocaproic acid 4-5 g IV) if cryoprecipitate is contraindicated

**Antiplatelet agents:** DDAVP 0.4 mcg/kg x 1, if neurosurgical intervention, transfuse one apheresis unit