



Emergent Reversal of Injured Anticoagulated Patients

Purpose: To improve patient safety through rapid identification of compromised patients who may require emergent correction of their coagulopathy or platelet dysfunctions and administration of that corrective therapy as soon as possible. To facilitate a systematic response for the emergency release and transport of Fresh Frozen Plasma (FFP) products to meet the needs of the coagulopathic patient.

Scope: Identify potential candidates at the earliest opportunity (i.e. Emergency Department).

- A. Inclusion criteria include patients taking the following drugs:
 1. Warfarin (Coumadin) orally
 2. Clopidogrel (Plavix) and other oral antiplatelet medications
 3. Oral direct thrombin and anti-factor Xa anticoagulants
- B. Mechanism of injury associated with falls, motor vehicle crash, or other trauma leading to a potential injury.
- C. Alteration in level of consciousness.
- D. Actual extracranial and /or intracranial hemorrhage on non-contrast CT scan of the brain.
- E. Actual hemorrhage noted on FAST exam or CT scan of chest/abdomen/pelvis.
- F. Those patients with injuries and life-threatening hemorrhage.

1. Warfarin (Coumadin)/INR greater than 1.4

- Vitamin K 10 mg IV in 0.9% sodium chloride 25 mL over 30 minutes if not already given
- KCentra (4 factor PCC, 4F-PCC) based on the following chart

Deliver KCentra at a Maximum Rate 200 unit per min.

Ensure INR rechecked 30 minutes after KCentra

Pre-treatment INR	2 to less than 4	4 to 6	Greater than 6
Dose (units of factor IX) Per kg body weight	25 units per kg	35 units per kg	50 units per kg
Maximum Dose (units of Factor IX)	Do not exceed 2500 units	Do not exceed 3500 units	Do not exceed 5000 units

If KCentra unavailable consider FEIBA (aPCC, activated PCC)

INR 5 or less, give FEIBA approximately 500 Units IV over 10 minutes

INR greater than 5, give FEIBA 1000 Units IV over 15 minutes

Repeat INR in 30 minutes, if greater than 1.5 contact physician to determine if additional dose is needed

2. Direct oral anticoagulant

Direct Factor Xa inhibitors - rivaroxaban (Xarelto), apixaban (Eliquis), edoxaban (Savaysa)

- Determine when dose taken last
- Give oral activated charcoal if recent, less than 2-hour post ingestion
- Give KCentra (4F PCC) 25 Units per kg (Do not exceed 2500 Units) IV over 15 minutes
- If KCentra unavailable consider FEIBA (activated PCC, aPCC)

50 Units per kg IV over 30 minutes

Direct thrombin inhibitor - dabigatran (Pradaxa)

- Determine when dose taken last
- Give oral activated charcoal if recent, less than 2 hour post ingestion

Hemodialysis removes 62% in 2 hrs and 68% in 4 hrs

- Give idarucizumab (Praxbind) 5 g IV (2.5 G IV over 5 minutes every 5 minutes for 2 doses)

Further Dosing Based on aPTT and clinical relevance of bleeding and surgery or procedure

- If idarucizumab unavailable, consider KCentra (4F PCC) 50 Units per kg (Do not exceed 5000 Units) IV over 30 minutes
- If idarucizumab unavailable, consider FEIBA (activated PCC, aPCC)

50 Units per kg IV over 30 minutes

3. Antiplatelet medications

Aspirin or P2Y12 Agents: clopidogrel (Plavix), prasugrel (Effient), ticagrelor (Brilinta), ticlopidine (Ticlid), cangrelor (Kengreal)

- Give desmopressin (DDAVP) 0.3 mcg per kg in 50 mL 0.9% sodium chloride IV over 30 minutes
- Consider platelet transfusion

4. Reverse injectable anticoagulants

Heparin

- Give Protamine 1 mg for every 100 Units of heparin.
- Maximum protamine dose is 50 mg in 25 mL NS IV over at least 10 minutes

enoxaparin (Lovenox)

- Protamine 1 mg neutralizes 1 mg of enoxaparin if enoxaparin was given within 8 hours.

A second dose of protamine of 0.5 mg per 1 mg of enoxaparin may be given if a repeat aPTT measured 3 to 4 hours after the first dose of protamine remains prolonged.

- Protamine 0.5 mg per 1 mg of enoxaparin may be given if enoxaparin was given more than 8 hours prior.

- If at least 12 hours have elapsed since the last enoxaparin sodium injection, protamine administration may not be required; however, even with higher doses of protamine, the aPTT may remain more prolonged than following administration of heparin.
- Maximum protamine dose is 50 mg IV over at least 10 minutes

fondaparinux (Arixtra)

- Give Novoseven IV 90 mcg per kg (rounded to nearest 1 mg) over 5 minutes: maximum dose 10 mg
- Consider FEIBA (aPCC, activated PCC) 20 Units/kg IV over 30 minutes

REVIEW/REVISION HISTORY

Review/Revision Date	Approved by:
Created 09/2014	Trauma Services
Revised 12/2017	Trauma Services
Revised 02/2022	Trauma Services