

PRACTICE GUIDELINE

Effective Date: 1-25-12

Manual Reference: Deaconess Trauma Services

TITLE: **GUIDELINE FOR THE CARE OF PATIENTS TAKING ANTICOAGULANT AND ANTIPLATELET AGENTS SUSTAINING TRAUMATIC INJURY (with particular emphasis on the geriatric patient)**

PURPOSE: Those patients who suffer a traumatic injury and are taking an anticoagulant or antiplatelet agent may require a rapid reversal of medications inhibiting the clotting process. Of paramount importance are those with traumatic brain injury (TBI). Anticoagulants and antiplatelet agents are taken by many patients and especially geriatric patients to avoid a life threatening venous embolic event or severe arterial occlusive episodes, but once a traumatic injury occurs, these agents may increase their mortality due to the disruption of the clotting factors. This protocol will assist trauma providers by decreasing the risk of a life threatening hemorrhage in trauma patients who are on therapy which impedes clotting. This has particular importance in the geriatric patient.

BACKGROUND:

Anticoagulation is a high risk therapy which is sometimes needed for patients with a wide variety of medical and surgical issues. Warfarin (Coumadin) is a commonly used oral anticoagulant that, via competitive antagonism of vitamin K, interferes with the gamma carboxylation of clotting factors FII, FVII, FIX, and FX and the regulatory anticoagulant proteins C, S, and Z. The functional levels of these proteins are thus titrated lower with an anticoagulant effect.^{6,7}

Providing these factors (FII, FVII, FIX, FX) rapidly in the trauma patient on warfarin (Coumadin) will reduce risk of life-threatening bleeding. To achieve this, the therapy is prothrombin complex concentrate (PCC) classified as 3-factor and 4-factor concentrate.

SUGGESTED CARE STRATEGIES:

REVERSAL GUIDELINE warfarin (Coumadin)

I. Upon arrival at Trauma Center

- A. At time of triage obtain vital signs and mini-neurologic examination (GCS, pupil size and reaction, lateralizing signs).
- B. Continued evaluation
 1. Repeat mini-neurologic exam at a minimum of every 1 hour
 2. Make every effort to determine the reason for anticoagulation
- C. Clinical signs of increasing Intracranial Pressure (ICP)
 1. Changed mini-neurologic examination
 2. Signs of increasing ICP: Declining GCS, headache, vomiting, varying respirations and bradycardia
 3. Cushing's phenomena: Increasing blood pressure, bradycardia, and abnormal breathing pattern
- D. Medical management of the anticoagulated TBI is focused on prevention of secondary brain injury.

II. Patient management to determine need for anticoagulant reversal

- A. Laboratory work and studies
 1. Obtain PT/INR, aPTT
 2. Obtain CTs to rule out head injury or source of bleeding
- B. Reverse Coumadin emergently to achieve INR <1.5 for:
 1. CT head with ICH
 2. Trauma with hemorrhagic shock
 3. Evidence of active bleeding on imaging
 4. Solid organ injury
 5. Need for emergent operative intervention

C. Reversal agents for Coumadin

1. Give phytonadione (vitamin K) 10 mg IV slowly (less than 1mg/min, and that dose is to be repeated every 12 hours until INR <1.5)
2. Give Kcentra: dosing (included in order set)
 - o INR <2 & acute major bleeding: 25units/kg (max 2000units)
 - o INR 2 to <4: 25units/kg (max 2500units)
 - o INR 4-6: 35units/kg (max 3500units)
 - o INR >6: 50units/kg (max 5000units)
 - o No repeat dose recommended
3. Recheck INR 30 minutes after infusion of Kcentra

REVERSAL GUIDELINE ANTIPLATELET AGENTS; DIRECT THROMBIN INHIBITORS; FACTOR Xa INHIBITORS

I. Antiplatelet agents; clopidogrel (Plavix®), prasugrel (Effient®), aspirin, ticlopidine (Ticlid®)

A. History to identify use

B. Monitoring

1. Thromboelastography (TEG®) if available

C. These medications within seven days of onset of incident

1. No pharmacologic reversal agent is available
2. Consider platelet transfusion in the following situations
 - a. Hemodynamic instability
 - b. Positive FAST
 - c. Pulmonary contusion on chest radiograph or CT
 - d. Any intracranial hemorrhage on CT scan
 - e. GCS <14 with clinical evidence of closed head injury
3. Desmopressin (DDAVP®) 0.3mcg/kg may be of value (mechanism unknown, effect somehow related to platelets, endothelial surface, FVIII and von Willebrand factor, tissue plasminogen activator and nitric oxide)

II. Direct thrombin inhibitor dabigatran (Pradaxa®)

A. Monitoring

1. aPTT (may not be elevated)
2. Thrombin clotting time (most reliable test—with time to result two days)

B. Reversal: for intravenous use only.

1. The recommended dose of PRAXBIND® (Idarucizumab) is 5g
2. There is limited data to support administration of an additional 5g of PRAXBIND
3. *Re-elevation of Coagulation Parameters:* In patients with elevated coagulation parameters and reappearance of clinically relevant bleeding or requiring emergency surgery/urgent procedure, an additional 5g dose of PRAXBIND® may be considered
4. The safety and effectiveness of repeat treatment with PRAXBIND® have not been established
5. Pradaxa treatment can be reinitiated 24 hours after administration of PRAXBIND®

III. Factor Xa inhibitor rivaroxaban (Xarelto®), apixaban (Eliquis®), edoxaban (Savaysa®) and betrixaban currently being evaluated in the Phase 3 studies

A. Monitoring:

1. No reliable testing available

B. This medication has no reversal agent

C. Four-factor PCC (Kcentra®) may be effective in reversing rivaroxaban (Xarelto®)^{8,9} and possibly apixaban (Eliquis®), edoxaban (Savaysa®) and should be considered for emergent need for reversal

IV. Protease-activated receptor (PAR-1) antagonist: vorapaxar (Zontivity®)

A. Thrombin receptor antagonist

1. vorapaxar is a new anti-platelet drug that is part of the PAR-1 antagonist family, a new class of anti-platelet drug
2. It functions by inhibiting thrombin-related platelet aggregation.

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Deaconess anticoagulation reversal (footnoted manuscript)

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