

**UAMS MEDICAL CENTER**  
**ACS SERVICES MANUAL**

**SUBJECT:** Rapid Evaluation and Reversal of Anticoagulants

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**UPDATED:** 12/2022

**EFFECTIVE:** 12/15/2022

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**RECOMMENDATION(S):** Nolan Bruce, MD

**APPROVAL:** 08/09/2015

**CONCURRENCE(S):** A. Jenkins, PharmD; R. Smith, PharmD

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**PURPOSE:**

To provide guidelines for rapid identification of the patient taking anticoagulants and institute appropriate agents to achieve appropriate reversal of the agent(s) involved.

**BACKGROUND:**

Currently, over six million patients in the US are treated with warfarin, with an increasing number being treated with an antiplatelet drug (APD), or one of the newer direct oral anticoagulants, dabigatran, rivaroxaban or apixaban. Coupled with the fact that the population over the age of 65 years (the largest proportion of chronically anticoagulated patients) is expected to double to 20% of the total U.S. population by the year 2030, suggests that the issue of head trauma in the chronically anticoagulated patient will continue to become more prevalent. Moreover, patients older than 65 years are at increased risk for intracranial hemorrhage (ICH) with resulting increased morbidity and mortality. Because of cerebral atrophy, significant ICH can occur without early intracranial pressure elevation and the associated mental status changes typically seen in the younger population. These injuries can go undetected if the usual criteria for determining the need for head CT are applied in the elderly, particularly those on anticoagulation. A more liberal approach to head CT should be utilized.

Based on these issues it becomes imperative to identify patients on anticoagulants as quickly as possible so that diagnostic imaging and prompt reversal of the anticoagulant may be implemented.

There is an existing UAMS Department of Pharmacy guideline for the reversal of anticoagulants. This shall serve as a supplemental guideline for the identification and triage of trauma patients. For specific reversal therapy, please see the separate Pharmacy guideline.

**PROTOCOL:**

**A. Rapid Identification:**

1. All patients presenting as a trauma activation shall be queried about their use of anticoagulants (AC) and antiplatelet (AP) drugs in their initial triage, immediately after the primary survey in trauma patients, or as soon as reasonably possible.
  - a. In instances where the patient cannot provide this information, efforts should be made to determine this information from other sources (family, pharmacy, primary physician, electronic medical record)
  
2. High clinical suspicion for ICH should be present in any patient found to be on an anticoagulant (warfarin, dabigatran, rivaroxaban, edoxaban or apixaban) or antiplatelet therapy (clopidogrel, prasugrel, ticagrelor) who presents with a blunt trauma mechanism including a ground level fall (i.e. fall from standing) and has at least one of the following:
  - a. History of loss of consciousness
  - b. History of mental status changes (i.e. GCS < 15)
  - c. Any sign of external injury to the head or neck
  - d. Any history of trauma to the head or neck

*These guidelines were prepared by the UAMS ACS Division. They are intended to serve only as a guideline based on current review of the medical literature and practice. They are neither policies nor protocols. Their use is at the discretion of the managing physician.*

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**B. Triage**

1. Patients screening positive for use of AC or AP with high clinical suspicion for ICH as described in Section A above should receive the following:
  - a. Patients meeting trauma activation criteria should be moved to the trauma bay and the trauma team should be activated at an appropriate level (see separate trauma activation criteria).
  - b. All patients should have a STAT blood draw for CBC, Chemistry, ROTEM and Type & Screen with initiation of adequate peripheral IV access.
  - c. Additional lab work to assess for therapeutic AP or AC should be sent based on the specific medication for patients on:
    - Warfarin (Coumadin/ Jantoven)
      - PT/INR should be sent.
    - Clopidogrel (Plavix), Prasugrel (Effient), Ticagrelor (Brilinta)
      - P2Y12 (VerifyNow PRU) should be sent
        - Value <180 suggests P2Y12 inhibitor effect
    - Dabigatran (Pradaxa)
      - ROTEM will suffice and is highly predictive
        - Prolonged CT in the EXTEM directly correlates to dabigatran concentration,  $R = 0.92^2$
    - Rivaroxaban (Xarelto), Apixaban (Eliquis) and Edoxaban (Savaysa)
      - ROTEM will suffice and is moderately predictive
        - May see prolonged CT in drug presence, but normal CT does not reflect absence of the drug<sup>3</sup>
    - Therapeutic Heparin or Enoxaparin
      - Anti-Xa level and ROTEM with HEPTTEM should be sent.
    - Aspirin (which is not considered in activation criteria)
      - Platelet Function Analysis (PFA-100) should be sent.
        - Col/Epi time <185 excludes aspirin-induced platelet dysfunction.
      - If the patient's medication status cannot be determined through the means described in section A, ROTEM, PT/INR, PFA, P2Y12 should be sent to screen for anticoagulant use.
    - d. Initiation of emergent head CT. Patients failing to meet trauma criteria should receive equal prioritization with trauma and stroke activation patients.
    - e. Immediate interpretation of head CT by Radiology with direct call back to the ED physician. The interval between ordering the head CT and interpretation resulting to the ED physician should be no more than 30 minutes.
    - f. Initiation of treatment / reversal as indicated for abnormal lab or CT findings (See below).

**C. Treatment patients on AP or AC with CT findings (ICH)**

1. For specific reversal guidelines refer to the UAMS Pharmacy Guideline for Reversal of Anticoagulants
2. See Management of Traumatic Brain Injury guideline.

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**D. Treatment of patients on AP or AC with normal head CT**

1. A period of 24-hour observation with serial neurological exams is usually unnecessary, but can be considered on a case by case basis in patients taking warfarin (particularly those patients with INR's > 3), dabigatran, rivaroxaban, edoxaban, or apixaban.
2. Unless indicated for other injuries, reversal of anticoagulant or correction of therapeutic INR's in the setting of a normal head CT is unnecessary. Consideration should be given to correction of supratherapeutic INR's.
3. Repeat head CT is not indicated without changes in neurological exam.

**Performance Monitoring:**

1. Documentation of anticoagulant and antiplatelet therapy query and findings
2. PT/INR or ROTEM result present on all patients with evidence of ICH on CT or significant head trauma (P2Y12 for patients on Plavix, Effient, or Brilinta; PFA-100 for patients on aspirin)
3. Time interval from arrival to CT Scan completion less than 30 minutes in patients on anticoagulation or antiplatelet therapy
4. Reversal agent ordered within 1 hour from time of CT Scan completion.
5. Administration of appropriate reversal agent. (Exclude if NA or patient received reversal agent at OSH.)

**REFERENCES:**

1. Conway, Susan E., et al. "Laboratory and Clinical Monitoring of Direct Acting Oral Anticoagulants: What Clinicians Need to Know." *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, vol. 37, no. 2, 2017, pp. 236-248., <https://doi.org/10.1002/phar.1884>.
2. Sokol, Juraj, et al. "Impact of Dabigatran Treatment on Rotation Thromboelastometry." *Clinical and Applied Thrombosis/Hemostasis*, vol. 27, 2021. <https://doi.org/10.1177/1076029620983902>.
3. Pavoni, V.; Giancesello, L.; Conti, D.; Ballo, P.; Dattolo, P.; Prisco, D.; Görlinger, K. "In Less than No Time: Feasibility of Rotational Thromboelastometry to Detect Anticoagulant Drugs Activity and to Guide Reversal Therapy." *J. Clin. Med.* 2022, 11, 1407. <https://doi.org/10.3390/jcm11051407>
4. Angiolillo DJ, Been L, Rubinstein M, Martin M, Rollini F, Franchi F. "Use of the VerifyNow point of care assay to assess the pharmacodynamic effects of loading and maintenance dose regimens of prasugrel and ticagrelor." *J Thromb Thrombolysis*. 2021 Apr;51(3):741-747. doi: 10.1007/s11239-021-02386-7.
5. Paniccia R, Antonucci E, Gori AM, Marcucci R, Poli S, Romano E, Valente S, Giglioli C, Fedi S, Gensini GF, Abbate R, Prisco D. Comparison of different methods to evaluate the effect of aspirin on platelet function in high-risk patients with ischemic heart disease receiving dual antiplatelet treatment. *Am J Clin Pathol*. 2007 Jul;128(1):143-9. doi: 10.1309/0G1PEJ00J8KP8357.