RECOMMENDATIONS FOR DOAC TO INTRAVENOUS HEPARIN TRANSITION

This algorithm is intended as a general guideline, not a protocol, for transitioning patients taking DOACs (direct oral anticoagulants) to IV heparin. These recommendations should not replace clinical judgement along with individual assessments of bleeding/thrombotic risks. **SEE PAGES 2-3 FOR FULL GUIDELINES.**

**Confirmed Recent**† Use of Factor Xa Inhibitor: APIXABAN, RIVAROXABAN, or EDOXABAN

- Check baseline Factor Xa Inhibitor/HIXA level* at next dosing interval

  - Baseline*
    - Apixaban ≤20, Rivaroxaban ≤25, or HIXA ≤0.7
    - Apixaban >20, Rivaroxaban >25, or HIXA >0.7

  - Initiate Nurse-Managed Anti-Xa Heparin Infusion
    - NO BOLUS

  - Initiate Provider-Managed** PTT Heparin Infusion
    - NO BOLUS
    - **UWMC-NW uses Nurse-Managed PTT Protocol in addition to an Anti-Xa Protocol

  - Monitor Factor Xa Inhibitor/HIXA levels* at least daily (consider every 6-12 hr levels for critically ill patients)

  - When Apixaban ≤20, Rivaroxaban ≤25, or HIXA ≤0.7 →
    - Check STAT HIXA (if monitoring apixaban or rivaroxaban levels) and switch to Nurse-Managed Anti-Xa Heparin Infusion
      - NO BOLUS
      - If HIXA 0.3-0.7: order current heparin dose
      - If HIXA <0.3: consider increasing current dose by 1-4 units/kg/hr

**Confirmed Recent**† Use of DABIGATRAN

- Initiate Nurse-Managed Anti-Xa Heparin Infusion
  - NO BOLUS
  - **UWMC-NW uses Nurse-Managed PTT Protocol in addition to an Anti-Xa Protocol

- Initiate Provider-Managed** PTT Heparin Infusion
  - NO BOLUS
  - **CAUTION if Apixaban >200, Rivaroxaban >200, or HIXA >1.1**

- Hold heparin and monitor Factor Xa Inhibitor/HIXA levels* levels daily (consider 6-12 hr levels for critically ill patients)

- When Apixaban ≤20, Rivaroxaban ≤25, or HIXA ≤0.7, start Nurse-Managed Anti-Xa Heparin Infusion
  - NO BOLUS

**Recent** = within 72 hours

**HMC and UWMC-NW use HIXA levels**

- HIXA = heparin anti-Xa level (units/mL)

**UWMC-ML use levels below:**

- Anti-Xa for apixaban level (ng/mL)
- Anti-Xa for rivaroxaban level (ng/mL)

For patients on edoxaban, use HIXA

**UWMC-NW use levels below:**

- Anti-Xa for apixaban level (ng/mL)
- Anti-Xa for rivaroxaban level (ng/mL)

For patients on edoxaban, use HIXA

**UWMC-ML use levels below:**

- Anti-Xa for apixaban level (ng/mL)
- Anti-Xa for rivaroxaban level (ng/mL)

For patients on edoxaban, use HIXA

Anticipate 24-72 hrs of PTT monitoring based on factor Xa inhibitor clearance time

*HMC and UWMC-NW use HIXA levels

**UWMC-ML use levels below:**

- Anti-Xa for apixaban level (ng/mL)
- Anti-Xa for rivaroxaban level (ng/mL)

For patients on edoxaban, use HIXA

**UWMC-NW uses Nurse-Managed PTT Protocol in addition to an Anti-Xa Protocol

**UWMC-ML uses Nurse-Managed PTT Protocol in addition to an Anti-Xa Protocol

Assess bleeding and thrombosis risk

Greater Thrombosis Risk

Greater Bleeding Risk
1. DETERMINE Anticoagulant Use History
   a. Patients with confirmed recent (within 72 hours) use of dabigatran (direct thrombin inhibitor) should be initiated on the Nurse-Managed Anti-Xa Heparin Infusion (no boluses)
      i. Consult Hematology if concern for residual dabigatran effect, e.g., patients with acute renal failure
      ii. If needed, presence of dabigatran effects may be detected with a rapid direct oral anticoagulant (DOAC) screen
   b. Patients taking apixaban or rivaroxaban should be ordered a factor Xa inhibitor specific level or heparin anti-Xa level (HIXA) at the time of the next dosing interval and at least daily thereafter (consider every 6-12 hour levels for critically ill patients)
      i. UWMC-ML uses factor Xa inhibitor-specific levels; HMC and UWMC-NW use HIXA levels
      ii. Patients previously on apixaban, order levels 12 hours after the last dose and at least daily thereafter
      iii. Patients previously on rivaroxaban, order levels 24 hours after the last dose and at least daily thereafter
   c. Patients taking edoxaban should be ordered a HIXA level 24 hours after last dose and at least daily thereafter
      i. Edoxaban specific level not available
   d. Patients taking prophylactic doses of an oral factor Xa inhibitor or if significant time has passed since the last therapeutic dose, consider checking a baseline HIXA level first prior to initiating heparin
      i. If HIXA level <0.1 units/mL, use the Nurse-Managed Anti-Xa Heparin Infusion based on indication

2. CHOOSE Which Heparin Protocol to Initiate
   a. General notes:
      i. Heparin should be initiated no earlier than at the time of the next dosing interval of the factor Xa inhibitor
      ii. An exception may be in cases of oral factor Xa inhibitor treatment failure, i.e., new, objectively confirmed venous thromboembolism where heparin may need to be started without delay and regardless of the last factor Xa inhibitor dose
      iii. May consider delaying heparin initiation if the apixaban or rivaroxaban levels are elevated, e.g., >200 ng/mL or if HIXA >1.1 units/mL* in order to avoid duplicate anticoagulant therapy
         1. Note: there may be instances where heparin is indicated irrespective of the drug level
   b. If baseline apixaban level ≤20 ng/mL, rivaroxaban ≤25 ng/mL, or HIXA ≤0.7 units/mL*, initiate Nurse-Managed Anti-Xa Heparin Infusion (no boluses)
   c. If baseline apixaban level >20 ng/mL, rivaroxaban >25 ng/mL, or HIXA >0.7 units/mL*, evaluate bleeding vs. thrombosis risk
      i. If greater bleeding risk, hold heparin and monitor daily levels (consider every 6-12 hr levels for critically ill pts.)
         1. When apixaban ≤20 ng/mL, rivaroxaban ≤25 ng/mL, or HIXA ≤0.7 units/mL*, initiate Nurse-Managed Anti-Xa Heparin Infusion (no boluses)
      ii. If greater thrombosis risk, initiate Provider-Managed PTT Heparin Infusion
         1. This is NOT a nurse managed protocol at UWMC-ML or HMC; however, UWMC-NW has a nurse managed PTT protocol.

3. USE the Provider-Managed PTT Heparin Infusion
   a. Initiation:
      i. Provider-Managed PTT Heparin Infusion includes a STAT baseline PTT
         1. Do not wait for results of the baseline PTT prior to initiating heparin unless suspicion for factor Xa inhibitor toxicity (e.g., in the setting of overdose, acute renal failure, acute liver failure) or if the patient has an unusually high risk of bleeding
         2. If baseline PTT is elevated, it may indicate the presence of underlying coagulopathy or excessive factor Xa inhibitor effects; recommend consulting Hematology in these situations
   b. Ordering:
      i. Order Provider-Managed PTT Heparin Infusion
         1. Do not order an initial heparin bolus
         2. Specify initial heparin rate
            a. Acute thrombosis: 18 units/kg/hr
            b. Atrial fibrillation, valve replacement, or bridging: 15 units/kg/hr
            c. Mechanical circulatory support: 15 units/kg/hr
               i. Concurrent Impella heparin purge solution: 5 units/kg/hr
            d. Acute coronary syndrome or acute ischemic stroke: 12 units/kg/hr
3. Specify PTT goal
   a. Regular intensity: 60-100 seconds
   b. Low intensity: 60-80 seconds

c. Adjusting:
   i. Providers are responsible for making dose adjustments
      1. It is recommended to monitor factor Xa inhibitor/HIXA* levels at least daily
         a. Anticipate 24-72 hours of PTT monitoring based on factor Xa inhibitor clearance time
         b. Note: may consider every 6-12 hour levels for critically ill patients
   ii. Algorithm available on UW Medicine Anticoagulation Services Website → Monitoring Heparin With PTT Levels

d. Switching to Nurse-Managed Anti-Xa Monitored Heparin Protocol:
   i. Patients should be switched to the Nurse-Managed Anti-Xa Heparin Infusion based on indication when the apixaban or rivaroxaban level is near undetectable (<20 ng/mL or <25 ng/mL, respectively) or when HIXA level <0.7 units/mL*
      1. Algorithm available on UW Medicine Anticoagulation Services Website → Heparin Infusion Algorithms
   ii. Check STAT HIXA level (add-on laboratory test if a PTT was drawn within the last 6 hours)
   iii. Specify initial heparin dose in the new order
      1. If the HIXA level is within 0.3-0.7 units/mL: order current heparin dose
      2. If the HIXA level is <0.3 units/mL: consider increasing current heparin dose by 1-4 units/kg/hr
      3. Note: no bolus is required

* UWMC-ML uses factor Xa inhibitor-specific levels; HMC and UWMC-NW use HIXA levels

Abbreviation: DOAC = Direct Oral Anticoagulant. HIXA = UW Medicine lab code for heparin infusion anti-Xa, also known as heparin-calibrated anti-Xa or anti-Xa for heparin. PTT = Partial Thromboplastin Time