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APPENDIX

CONSIDERATIONS FOR TRANSITIONING FROM aPTT TO ANTI-Xa TO MANAGE HEPARIN THERAPY

1. Identify who will be coordinating the process and members of the working group. It should include laboratory services, hospital informatics, pharmacy, nursing, and selected physicians.
2. Determine the timeframe available for implementing the change where the current aPTT lot may run out or expire.
3. Assign an individual who will coordinate the process and meetings to assign tasks and deadlines.
4. Research available literature to understand current knowledge of the two assay approaches.
5. Determine that reporting turnaround times to report values are the same.
6. Assign champions to develop the necessary education materials customized to all clinicians impacted (e.g., laboratory, nursing, prescribers, pharmacy).
7. Identify all order sets that include heparin therapy and the test (aPTT) used for management; order sets that include a test (aPTT) intended to assess if heparin effects are present prior to an intervention.
    a. When making changes to order sets, identify prescribing champions to review changes.
    b. Make sure order sets comply with hospital policy.
8. Identify all policies involved, and make the necessary changes.
9. Consider a role for the aPTT as a baseline test to determine any independent drivers for bleeding. Adding a baseline anti-factor Xa may assist in determining presence of an oral anti-factor Xa antagonist.
10. Adjust reports and any customized data flow sheets generated in the electronic records to show the reported anti-Xa activity result.
11. The common goal is 0.3–0.7 units/mL; however, lower goals may be considered in higher bleeding risk situations or when lower thrombosis risks are present. Values <0.3 units/mL may be considered for thromboprophylaxis targets.
12. After implementation, provide resources to assist with questions. A document on frequently asked questions should be prepared in advance and include the following:
    a. Instructions on where information is found and descriptions of the test.

b. Clinical Information such as the difference between tests, target ranges, baseline values, how to respond to unexpected values such as high baseline values, etc.

c. Pharmacy information on approaches to customize orders and what should be avoided, target range modification if bleeding concerns are present, continued assessment for other adverse effects (e.g., heparin-induced thrombocytopenia, bleeding), sampling time relative to bolus dosing.

d. Laboratory Information such as assay turnaround time, collection tube, how to order laboratory tests, common items interfering with the anti-Xa assay (e.g., hemolysis), how to contact laboratory for questions.

e. Additional resources available and where to access.

Observations:

1. Variability between anti-Xa and aPTT values will occur. Samples may show high anti-factor Xa and low aPTT, or low anti-factor Xa and high aPTT values. Therefore, the response between assays may not be consistent. This is expected because correlation has always been known to be poor. (See Chapter 21 on laboratory measures on determining therapeutic aPTT levels based on anti-factor Xa levels.)
2. If other anti-factor Xa tests are also available but utilize a different calibrator, make sure this is clearly described in the ordering process. It is strongly recommended to list the test in your electronic medical record based on the agent you want to estimate the level, not the assay type used (i.e., list as "heparin level" or "apixaban level," or anti-factor Xa—heparin, anti-factor Xa—apixaban instead of "anti-factor Xa" to ensure correct test is used).
3. The aPTT most likely cannot be fully replaced if parenteral direct thrombin inhibitors are used, or testing necessary to hemophilia's heparin is used after Xa inhibiting direct oral anticoagulants, etc.
4. No test is perfect, and there are situations impacting the aPTT or anti-Xa independently or together.
5. Review of revised electronic order sets should be carefully done before going live. It is important for a pharmacist to review dose titrations, even if nurses primarily handle dose titrations, to ensure drips receive critical review.
6. In the presence of an oral anti-factor Xa inhibitor, the baseline anti-factor Xa assay may be elevated. The process for patient care and change to heparin in this setting may depend on the situation, including the indication for anticoagulation, history of the oral anticoagulant, and observed anti-factor Xa value. Handling these titrations is still an evolving science, but one consideration is to use the aPTT in the short term if the patient has an active thrombosis, or withholding heparin therapy if no active thrombosis and it is likely the patient is still fully anticoagulated. (Laboratory testing may be helpful to determine this.)

Anti-Factor Xa	aPTT	Influencing Situation
Increase	Increase	Poor blood sampling Underfilled tubes Impaired renal function (↓ elimination)
Increase	Little/no effect	Recent use of other anti-Xa agents Triglyceride >360 mg/dL
Decrease	Increase	Inadequate centrifugation (inadequate platelet removal)
Decrease	Little/no effect	Gross hemolysis in sample Total bilirubin >6.6 mg/dL
Decrease	Decrease	Increased heparin binding proteins Obesity (higher tissue distribution) AT deficiency (depending if anti-Xa test adds AT)
Little/no effect	Increase	High citrate concentration in collection tube ↓ Clotting factors (vitamin K antagonists or liver disease) Consumptive coagulopathy Lupus anticoagulant Specific low clotting factors (factor IX, XI, XII, prekallikrein) Elderly

aPTT: activated partial thromboplastin time