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Coagulation Specimen Collection and Anticoagulant Testing Information

Coagulation test results are especially sensitive to improper specimen collection and handling. The results of the tests are greatly affected by under filling the blood tubes, partially clotted specimens, hemolysis or plasma frozen without assuring adequate centrifuging. It is therefore crucial that specimens be collected in the following manner for the best results. The centrifugation and specimen processing for platelet-poor plasma is rather complicated, so a clinic may choose to send the patient to one of the CHI Health Laboratory Patient Service Centers for blood collection and processing of most coagulation tests.

SPECIMEN COLLECTION:

1. Coagulation specimens are collected in light blue vacuum tubes, 3.2% buffered sodium citrate in 2.7 ml draw tubes. Only very difficult draws are to be collected in 1.8 ml draw tubes.
2. Blood is to be obtained by venipuncture.
3. Avoid slow flowing draws and /or traumatic venipuncture as either of these may result in an activated or clotted, or hemolyzed sample.
4. Order of Draw for coagulation studies:
   a. If using regular vacutainer hub and needles - draw one 4 ml Blue citrate tube, collect first.

   b. When using a winged blood collection set for venipuncture and a coagulation (citrate) tube is the first specimen tube to be drawn, a discard tube should be drawn first. (discard tube should be a non-additive or coagulation tube.)
      i. The discard tube must be used to fill the blood collection set tubing's "dead space" with blood but the discard tube does not need to be completely filled. This first tube is then discarded.
      ii. Collect a 2nd blue citrate tube to be used for testing. This will ensure proper blood-to-additive ratio of the specimen for testing.
6. Coagulation specimens must be completely filled but not overfilled. Tubes are marked with a frosted minimum fill line. The ratio of blood to anticoagulant must be maintained at 9 to 1 for good test results. **Specimens that have less than minimum fill or more than 110% optimal fill must be rejected.**
7. Fill light blue citrate tubes as far as the vacuum will allow. Expired tubes may not draw to the minimum fill line. Mix by gently inversion of tube 4-6 times.
   Under mixing could cause clotting and over mixing could cause activation of the clotting mechanism.
8. Picture guides for the correct fill volumes are available from CHI Health Laboratory.
9. Whole blood samples are only acceptable for Prothrombin Time and INR from patients on warfarin therapy. Most PTTs and other coagulation specimens cannot be collected, transported, processed and tested within the 4 hour stability limit.

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ANTICOAGULANT TESTING INFORMATION:

1. If a patient is taking an anticoagulant medication, please indicate the medication on the lab request.
2. **Warfarin (Coumadin)** therapy is monitored using the PT INR result. The PT INR is a calculated value that helps to minimize the differences between Prothrombin Time testing done at different worldwide locations, with different reagents and with different instruments used.
3. **Heparin** therapy is often monitored using PTT results. The therapeutic range for the PTT that corresponds to a heparin level of 0.3 to 0.7 IU/mL has been determined by CHI Health Labs and is reported with each PTT result.
4. **Lovenox** therapy is monitored with a Heparin anti Xa LMW level. Lovenox therapeutic range for the Heparin anti Xa is 0.5 to 1.2 IU/mL. The therapeutic range for low molecular weight heparins other than Lovenox can be found in the particular drug's package insert.
5. Anticoagulant therapy with **direct thrombin inhibitors** (Lepirudin, Bivalirudin, Argatroban) may be used in the place of heparin if a patient is sensitive to heparin and develops thrombocytopenia. These drugs are often monitored by methods that include the patient's PTT results compared to the laboratory current mean normal PTT, expressed as a ratio.

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