SITES AFFECTED

_X Enterprise  ___ Chandler  ___ Good Samaritan

PROCUREMENT OF BONE MARROW SPECIMENS

A technologist at Chandler CORE and Samaritan are assigned to Bone Marrow duties Monday through Friday from 8AM to 4PM, excluding holidays. When a bone marrow procedure on an adult patient is scheduled during these hours, a technologist will be available to assist the physician with the specimen collection. A technologist does not assist with the collection of pediatric bone marrows.

Due to the potential of compromising specimen integrity, the technologist must be kept informed of all scheduled bone marrow procedures in order to arrange for the appropriate processing of specimens. If the technologist is unable to complete the processing by the end of the scheduled shift, then the pathology resident will be notified and will assume the processing responsibility. Therefore, it is recommended that all pediatric bone marrow samples be submitted to the laboratory on days in which bone marrow coverage is maintained and before 3PM to allow for adequate processing time. It is also recommended that all adult procedures be scheduled no later than 3:15PM (3:00PM at Samaritan) on days in which bone marrow coverage is maintained to allow for adequate processing time.

In addition, if a bone marrow is received in the laboratory during a timeframe that bone marrow coverage is not provided (nights, weekends, holidays), the specimen processing will be handled by the pathology resident on-call. A Chandler CORE Lab technologist will be responsible for notifying the pathology resident.

PRINCIPLE

Examination of the marrow is critically important in the study and management of a wide variety of hematologic disorders. Marrow may be obtained for examination without significant risk or discomfort and is quickly processed. At birth, all bones contain hematopoietic marrow. Fat cells begin to replace hematopoietic marrow in the extremities in the fifth and seventh year. By adulthood, the hematopoietic marrow is limited to the axial skeleton and the proximal portions of the extremities.

Marrow may be obtained by aspiration and/or biopsy utilizing a Jamshidi needle. The site chosen for aspiration depends on the age of the patient and the skill of the operator. Most marrows are now aspirated from the posterior iliac crest but may also be obtained from the anterior iliac crest or sternum. The hazards of
marrow aspiration are minimal when the procedure is performed carefully. Penetration of the bone with damage to the underlying structures is possible with all marrow procedures, but the hazard is greatest in the sternal aspirations where the second interspace is only 1cm thick in adults.

**TRAY SET UP**

1. Identify the patient using two identifiers (name and date of birth) using armband or verbal communication. If the patient is unable to identify him or herself, the last choice should be through a family member or healthcare professional.

2. Verify the samples to be drawn with the physician and/or the orders from the chart or computer order system.

3. Remove the outer plastic from the bone marrow tray and place on the bedside table.

4. Open the sterile drape by the ends. Unfold all four corners to expose the tray. Maintain sterile field at all times.

5. Place any other items needed on the tray at this time in a sterile fashion. (20ml syringe along with any other needles, syringes, etc)

6. Disinfect your EDTA anticoagulant, yellow top tubes and heparin by wiping them with alcohol. Open the Lidocaine ampules using a gauze.

7. Once all necessary supplies are placed on the tray and specimen tubes have been disinfected, you are ready to put on sterile gloves. Using sterile technique, open the outer package of gloves and remove the inner package containing the gloves. Place on flat surface and open the inner paper to expose the gloves.

8. With your left hand, grab the inner sleeve of the right glove and place on right hand. With the right sterile gloved hand, grab the sterile left hand glove by the fingertips. With the left unsterile hand, grab the inner sleeve of the left glove and gently pull down. Place your sterile right gloved hand inside the left glove between the section that is folded and place on the left hand. You are now ready to proceed with tray set up.

9. The kit is composed of 2 trays, one on top of the other. Separate the two and lay on the sterile drape that you unwrapped earlier. Remove all items (iodine, gauze, drapes, etc.) from the top tray and lay aside on the sterile drape.
10. Take the 20mL syringe (used for Lidocaine) and attach the clear filter needle provided on the bottom tray. Lay on the left side of the empty tray.

11. Take the next 20mL syringe (used for EDTA/morphology) and attach a needle, lay it to the right of the other syringe. The next sample will be a 10mL syringe (used for cell marker samples) and attach a needle, lay it beside the 20mL syringe. Continue with placing a needle on a 5mL syringe and lay it to the right of the 10mL. Uncap all needles. Prepare all other syringes needed at this time.

12. Remove all plastic sheaths from the Jamshidi needle, scalpel and accessories.

13. You are now ready to begin the one handed sterile portion of the set up.

14. With right hand, pick up the first 20mL syringe. Pickup the Lidocaine ampule with the left hand (which is now going to be the dirty hand). Draw the Lidocaine (about 10mL) into the syringe and return to the tray. Do the same with the remaining anticoagulants (1mL EDTA, ACDA in yellow top tube, 0.5mL 10,000 unit heparin) making sure that the sterile hand picks up the items from the tray and the dirty hand picks up the items from the BM cart.

15. The tray is now ready for the physician. The first sample needs to be the EDTA for morphology. Make sure they draw no more than 2-3mL’s of marrow in the EDTA syringe. The second syringe should be 2-3mL’s in the cell marker syringe and the last sample to be drawn will be at least 3mL’s in the cytogenetic syringe. Encourage them to obtain at least 1cm of biopsy for leukemias and 1.5cm for lymphomas.

16. When procedure is finished, make touch preps of the biopsy before placing in formalin. Marrow for cell markers goes back in the yellow top tube. Cap the EDTA and the cytogenetics syringes. Label all samples and deliver them to the respective labs on the way back to the 6th floor. Samaritan will deliver samples to Chandler within 2-4 hours of collection via courier.

**BM COLLECTION ORDER**

Aspiration order

1. The first aspiration must be used for morphology (20mL I EDTA syringe)

2. The second should be Cell Markers and/or any yellow top tube.
Procurement of Bone Marrow

3. The third should be the cytogenetic sample (3mL heparinized syringe).

4. Collect any other tests ordered with the unknown virus and cultures being last.

* All specimens are to be mixed by inversion, labeled with the patient’s name and hospital number, placed in plastic bag and sent to the clinical lab along with a requisition.

In case of Dry Tap

If NO aspirate is obtained due to packed or fibrotic marrow, a small piece of biopsy may be sent for cell markers. Place a portion of biopsy in a red top tube with a small amount sterile saline which can be obtained from the nurses.

The Cytogenetics lab will also take a piece of the biopsy but have had little luck in processing. Place a portion of biopsy in a red top tube (NO additive) with a small amount sterile saline which can be obtained from the nurses.

TEST COLLECTION SPECIFICATION

MORPHOLOGY – Syringe contains 1ml 4% EDTA. Keep in the BM bucket until the next week and then discard into biohazard trash. The morphology specimen should be the first specimen obtained.

CYTOGENETICS &/or FISH – Collect 3mL of marrow into a syringe with no more than 0.5ml of 10,000U/mL Heparin. If specimen cannot be transported to Cytogenetics leave in CORE Lab refrigerator to store

CELL MARKERS – Using sterile technique, draw anticoagulant from a yellow top tube (ACDA) into syringe. Aspirate 3mL of marrow. IMP Lab is open until 11pm but if specimen cannot be transported to Lab, leave in CORE Lab to store. Cell markers is synonymous with Flow.

BCR/ABL gene rearrangements – 3mL bone marrow collected in the 4%EDTA. It must have its own specimen. IMP Lab is open until 11pm but if specimen cannot be transported to Lab, leave in CORE Lab refrigerator. Sent to ARUP
B cell gene rearrangements - Collect 3mL of sample into a syringe containing 1mL of 4%EDTA. This test goes to ARUP via Special Chemistry and is ambient for 24 hours.

PNH – Bone marrow should not be drawn for this test. The specimen of choice is peripheral blood.

BCL1 – Collect 3mL of sample into a syringe containing 1mL of 4%EDTA. Send to Special Chemistry before 4pm. Specimen is stable for 24 hours

BCL2 - Collected in the same manner as Cell markers. This sample goes to ARUP via Special Chemistry and is ambient for 24 hours.

STR - Collected in the same manner as Cell markers. IMP Lab is open until 9pm but if specimen cannot be transported to Lab, leave in CORE Lab to store.

T cell gene rearrangements - Collect 3mL of sample into a syringe containing 1mL of 4%EDTA. This test goes to ARUP via Special Chemistry and is ambient for 24 hours.

PCR 15:17 - Collect 3mL of sample into a syringe containing 1mL of 4%EDTA. This test goes to AUP via Special Chemistry and must be received by 3pm to be shipped. Ambient 1 hour **

ROUTINE, AFB AND FUNGAL CULTURES – obtain appropriate media from Bacti and inoculate media with 0.5 to 1mL of marrow immediately following aspiration. No anticoagulant is used. Send to Micro Lab at any time.

VIRAL CULTURES – Collect 3ml of marrow into a syringe containing 0.2 to 0.3mL of 10,000U/ml Heparin. Place labeled sample on ice and send to Micro Lab at any time.

HHV6 - Collect 3mL of sample into a syringe containing 1mL of 4%EDTA. Send to Micro Lab at any time. You may opt to have physician collect more in the syringe designated for morphology and split the sample.

PARVO B19 - Collect 3mL of sample into a syringe containing 1mL of 4%EDTA. Send to Micro Lab at any time. You may opt to have physician collect more in the syringe designated for morphology and split the sample.

**There are MANY OTHER TESTS that may be ordered on Bone Marrow that are not listed above. Check with Special Chemistry to see if they are a 'send out' test. They will also know the appropriate anticoagulant and if there are time constraints. If anticoagulant is not listed, use what is required for peripheral blood.
It is very important to take these steps before the procedure begins.

PROCESSING PROCEDURE

Processing the Bone Marrow Biopsy and Aspirate (at Chandler and Samaritan)

1. Make at least 2 touch preps at the bedside, before placing the biopsy in Formalin (to be delivered to Histology). The remaining slides may be processed in the Lab. Make 5-6 coverslip type slides and 2 push type slides for Fe.

2. The sample for morphology in the EDTA syringe is used to make the morphology and the Iron slides in the following manner:

For Morphology slides  (at Chandler only)

1. Mix the syringe several times

2. Place a portion of marrow on a slide, rotate and look for spicules. Using the underneath side of a 22x22 coverslip, collect several spicules
   Place this coverslip onto another glass slide and allow spicules to disperse(particles will be sandwiched between coverslip and slide)
   Grasp the edge of the coverslip and quickly pull apart.

3. Make 5-6 slides with 2 coverslip areas on each slide. Allow slides to dry.

4. Stain the slides with Wright/Giemsa using manual technique (See Wright Stain procedure) or run them through the automated stainer twice. Slides are ready to be coverslipped.

For Fe slides

1. Place a portion of marrow on a slide, rotate and look for spicules
   Using the underneath side of slide, collect several spicules
   Place this slide on top of another slide and push towards the end. Spicules should be found at the end.

2. Make 2 slides using this technique.

3. Allow slides to dry. Bone marrow Tech will stain these slides the next working day.

For Touch Preps
1. Stain the Touch Preps with Wright/Giemsa (see Wright Stain procedure) if the tap was dry or the aspirate was aspicular.

2. Slides are ready to be coverslipped.

The specimen will be accessioned in CoPath the next working day by Bone Marrow Tech

FORMS – NA

REFERENCES


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APPROVAL BLOCK:

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## Annual Review

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**Date version removed from manual:**

**Date procedure retired:**