

## **BONE MARROW Aspiration and Biopsy**

### **I. PRINCIPLE**

The bone marrow produces the cellular elements of the blood, including platelets, red blood cells and white blood cells. The aspirate is placed on glass slides, stained and examined by a pathologist under a light microscope. Bone marrow Aspirates may have flow cytometry or chromosome analysis requested. The biopsy is examined microscopically for cellularity and infiltrative processes.

### **II. CLINICAL SIGNIFICANCE**

A bone marrow aspirate and biopsy are helpful in diagnosing some of the following conditions

- A. Amyloidosis
- B. Anemias
- C. Hemochromatosis
- D. Leukemias
- E. Infectious diseases, such as leishmaniasis or HIV
- F. Lymphomas
- G. Multiple myeloma
- H. Myelofibrosis
- I. Neuroblastoma
- J. Polycythemia vera
- K. Thrombocythemia

### **III. SUPPLIES**

- A. Box of frosted slides
- B. 4 20 cc syringes Use Slip Tip!, Luer Lock syringes for phlebotomy don't work
- C. Slide folder
- D. Disposable blue mat
- E. Secureline black marker
- F. Ink Pen and Pencil
- G. Blank labels
- H. 4 X 4 sterile gauze (from central supply)
- I. Large Butterfly pressure bandage
- J. Elastiplast
- K. Phlebotomy supplies

- L. Bone Marrow Forms

**IV. REAGENTS**

- A. 2 Formalin (found in Histology)
- B. Rubbing alcohol
- C. Heparin lock flush 10 ml 10 USP
- D. 1% injectable xylocaine

**V. EQUIPMENT**

- A. Disposable Bone Marrow Kit ordered by the unit
- B. Illinois Needle
- C. 3 1/2 inch spinal needle
- D. Sharps container
- E. Sodium Heparin and EDTA vacutainer tubes

**VI. PATIENT PREPARATION**

The patient or patient's designee must sign an informed consent permit before the procedure. A CBC and Reticulocyte count are usually performed on the day of the procedure and these results along with a cumulative report are sent with the samples. This procedure does not require fasting or other preparation.

**VII. PROCEDURE:**

**A. Inpatient Bone Marrow Procedure**

*Note:* Medicare patients on Skilled Nursing will need to be moved and readmitted to another area of the hospital. Contact the skilled nursing manager to arrange the transfer and then proceed with the request.

- I. The lab will usually be notified of a bone marrow request by phone. Have the nurse read the exact order, so that we do not miss any cultures, FISH, cytogenetics or flow cytometry.
- II. Ask the nurse to order a CBC and reticulocyte count should be ordered for the day of the bone marrow. A downtime slip should be filled out for the Bone Marrow testing to be completed.
- III. Note: Our Pathologists no longer do Bone Marrow Biopsy and Aspirations. Illinois Cancer Care has Nurse Practitioners who do bone marrow biopsy and aspirations for the patients who see Cancer Care physicians. Check to see who will be performing the bone marrow procedure. Have the floor fill out a permit for the patient or their designee to sign and list the appropriate Nurse Practitioner. Verify that the patient has no other procedures scheduled. If they do, find out the times, so that we can work around other departments. We like to do bone marrow procedures between 9 a.m. and 1 p.m.

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- IV. Have the nurse order-
- Two disposable bone marrow trays
  - Two pair of gloves for the Nurse- Ask practitioner's size while on the phone
  - One bottle of 10ml 10 USP Heparin Lock Flush (If Flow is ordered)
  - 1% injectable Lidocaine if needed
- Request that the floor notify the lab when the permit is signed and supplies are received.
- If the request for a bone marrow comes on 2nd or 3rd shift. Please tape the order on the counter between the microscopes, so that dayshift technologists are notified of the procedure.

**B. Outpatient Bone Marrow Procedure**

1. Find out if a Nurse Practitioner from Illinois Cancer Care is associated with the case. Our Pathologists no longer perform Bone Marrow Biopsy and Aspirations. Finding out who will do the procedure must be done first before any scheduling proceeds.
2. Obtain the name of the patient, birth date, ordering physician, diagnosis, previous CBC and patient phone number from the physician's office. Have the office read the complete order so that we don't miss any cultures, flow cytometry or chromosomes. Find out if there are any days that the patient cannot come in for the bone marrow procedure.
3. We will have to call the office back with the date and time of the procedure.
4. We have been using Care Unit. Call the Care Unit Scheduling.
5. Call the attending physician's office back with the date and time. The office should fax the order to our Registration Department. The patient should arrive an hour in advance at the registration desk, then come to the lab for a CBC and Reticulocyte count.
6. Have the Care Unit or OR personnel order two disposable bone marrow trays (three for bilateral), heparin lock flush (if needed) and two pair of the glove size of the Nurse Practitioner.
7. The day of the procedure call to Care to confirm that the trays and gloves are ordered.

**C. Procedure for Bone Marrow Biopsy and Aspirate**

1. Stock the bone marrow tray with the supplies listed at the beginning of the procedure.
2. Pick up patient labels from the chart to label the specimen. The Practitioner will check the chart for the order and signed permit.
3. Introduce yourself and identify the patient by looking at the wristband and compare this information to the order and labels. Ask the patient to repeat their birth date as another identifier. The Practitioner will explain the procedure, risks and benefits.

4. Clear the patient's bedside table for the Practitioner to use. Find a second tray or table for you to work upon.
5. Place the disposable trays, Heparin Lock Flush and gloves on the Practitioner's tray.
6. Set up your table with the disposable mat to protect the surface. Place the Formalin container and marker on the table. Set out two slides at an angle for the aspirate to run down. Place at least fourteen slides in two rows. Have sodium heparin tubes ready if cytogenetics or flow cytometry are needed.

**VIII. TIMEOUT/BEFORE SKIN INCISION:**

- A. Confirm all team members are known to each other.
- B. Nurse announces "ALL STOP". All activity in the room will cease and the following is reviewed/confirmed:
- C. Correct patient identity using two patient identifiers
- D. Correct side and site are marked.
- E. An accurate consent form
- F. Agreement on the procedure to be done
- G. Correct patient position
- H. Safety precautions based on patient history or medication use
- I. For bedside procedures, allergies are reviewed
- J. The APN will explain the procedure and answer any questions before proceeding.
- K. Check that all equipment is available
- L. If all agree, the procedure may proceed.
  1. Make more than 6 wedge prep slides from the aspirate that has been drizzled down the two slides placed at an angle. Remember to tell the Practitioner if you see spicules.
  2. Squeeze out any air from the syringe with the aspirate and label with a patient label, date, time and site.
  3. If cytogenetics or flow cytometry are ordered, they will aspirate more bone marrow to be placed into sodium heparin tubes. The syringe for flow cytometry cannot clot, so it should be pre-primed with heparin lock flush solution. The tube for cytogenetics should not clot as well.
  4. Next the needle will be advanced to obtain a core biopsy. Make at least 6 roll preps from the biopsy. Roll the biopsy between two slides.
  5. Place the biopsy in Formalin, label with the patient label, date, time, and site.
  6. Dispose of all sharps in the patient's sharp container. Clean up all supplies and put the room back the way it was found.
  7. Bring the slides and specimens back to the lab. Record all information and tests ordered in the bone marrow logbook.
  8. Label all specimens with the Hospital generated label or a Sunquest test

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- label, date, time and site of the procedure.
9. Label all slides with the patient name, medical record number, and the date.
  10. Take the aspirate syringe, bone biopsy, unstained smears, peripheral smear and cumulative report, blank charge summary form, MMCI cytometry form and Bone Marrow information form to Histology.
  11. Note: After the Aspirate has clotted, it should be placed in formalin for transport. Please remind Histology of this criterion.
  12. Give cytogenetic and/or flow cytometry specimens to the send out area to be placed on a batch. These specimens should be placed on a batch separate from other send outs. Room Temperature storage!! Refer to the Methodist Lab Manual or call Methodist for requirements and codes, depending on what is ordered.
  13. Send all testing associated with the bone marrow, including Histology, together in one container to Methodist.
  14. Restock the bone marrow tray.

**V. REPORTING RESULTS**

Results of the Bone Marrow Aspirate and Biopsy are available in Power Path.  
Results of the Flow Cytometry and Cytogenetics will be appended to the Bone Marrow Report.

**VI. CHARGING**

Charging the patient for the Hematology Part of the Bone Marrow Procedure will be done in by the LIS Manager. Provide a downtime form with the patient demographic information.

**VII. REFERENCES**

Williams, J. et al: Hematology, 3rd Ed., p25-28.

Basic Techniques in Clinical Laboratory Science,3rd Ed.,p207.

REVISION HISTORY (began tracking 2011)			
Rev	Description of Change	Author	Effective Date
0	Initial Release	Cindy Schroeder	2/8/16
1	Updated process of sending specimens to Methodist; added more detail to patient ID; updated supplies	Sheanea LaCock	05/12/17

**Reviewed by**

Lead	Date	Coordinator/Manager	Date	Medical Director	Date
Sheanea LaCock	05/31/17	<i>Cindy Schroeder MT(ASCP)</i>	5/12/17	<i>John ... DO</i>	5/12/17