Peripheral Blood Stem Cell Collections For Low Weight Patients (≤ 20 kg)

**Background:** Apheresis is a procedure used to collect hematopoietic stem cells from the peripheral blood. Hematopoietic stem cells normally live in the bone marrow. They can be stimulated to move into the bloodstream where they can be collected. These cells are then used for a stem cell transplant.

**Stem Cell Mobilization:**

- Chemotherapy plus the use of medicines called colony stimulating factors (CSF’S), also known as growth factors. These medicines may include Neupogen/ Filgrastim (GCSF), biosimilar (tbo-GCSF/ Granix), and Mozobil (Plerixafor). These medications, alone or in combination, are used in autologous stem cell collection.

☐ Patient will be admitted to the inpatient unit the night prior to the collection procedure. Bed request will be placed by a member of the Pediatric BMT team and an email to the PCM team and the PICU nursing leadership team to also alert them of this upcoming admission.

☐ The patient will be admitted to the PMT service and upon admission, PMT will place a transfer order to the PICU for the following morning.

☐ Labs upon admission
  - Labs should be obtained upon admission if not drawn in the outpatient setting earlier that day.
    - CD34 count
      - CD34 count should be sent directly to tube station 82 and be sent by 2 pm on day of admission.
    - CBC with differential
    - Comprehensive chemistry, Magnesium, Phosphorous
    - Type & Screen

☐ Growth Factors
  - If insuflon is present, this may be used for administering the 2 growth factors.
  - G-CSF (10 mcg/kg/dose) SQ daily
    - If patient did not receive GCSF prior to admission, this needs to be administered as soon as possible.
    - On day(s) of collection: administered SQ at 0600
  - Plerixafor (0.24 mg/kg/dose) SQ each night at 2100
    - Plerixafor should be given if CD34 count is < 100.
    - If CD34 count is > 100, PMT should contact Apheresis (4-1785) to discuss how long the patient will be on the machine the following day based on the CD34 value that has been resulted. If calculations suggest that the patient will need to be on the machine for > 4 hours, consideration should be given to administer plerixafor the night before the collection.

☐ NPO post-midnight for apheresis catheter placement; this should be ordered by PMT.
Prior to apheresis catheter placement, platelet count should be > 50,000.

Some patients will require blood for Infectious Disease Markers (IDMs) on the day of collection. The Pediatric BMT team will let PICU and Apheresis nurses know if these labs are needed. The Apheresis nurse will obtain the labs when he/she accesses the patient.

- If IDMs need to be drawn prior to collection on the day of collection: the following information will need to be provided to the Apheresis nurse for completing the accompanying form:
  - Has the patient been transfused or infused (colloids or crystalloid) within the previous 48 hours? (Yes/No)
  - Patient weight
  - Total volume of blood transfused in the past 48 hrs.
  - Total volume of colloids infused in the past 48 hours.
  - Total volume of crystalloids infused in the past 1 hour.

Apheresis team will order the irradiated prbc that are needed for priming the apheresis machine.

Labs Day of Collection:

- CBC with Diff (0600)
- CD 34 (0600) and send directly to tube station 82
- Ionized calcium level (0600)

Prior to Procedure:

- Confirm team placing apheresis catheter (Peds Surgery or PICU Team).

Day of Procedure:

- If PICU team performing procedure, consent for sedation and procedure will be performed by PICU team and all the usual parameters of sedation will be followed per the hospital sedation policy. See ADMIN 0212
- Ensure NPO status.
- Prepare for intubation and apheresis catheter insertion.
- Patient will be intubated for catheter placement and will remain intubated for the length of the collection. Decision to remain intubated until CD34 result is known and apheresis line removed is at the discretion of the PICU attending.
- Ensure proper catheter is in room.
  - If a 9 French is too large for the patient, please contact Apheresis attending (4-1780 and asked to speak to the attending) about placing an 8 French temporary double lumen apheresis catheter.
Consider second IV for frequent lab draws – may require peripheral arterial line if unable to obtain 2nd IV that draws.

Point of Care (POC) Ionized calcium monitoring:
- Every 15 minutes x 3.
- Then every 30 minutes for the remainder of the procedure.
- Apheresis nurse may ask for more additional ionized calcium checks
- Procedure may last up to six hours depending on the weight/size of the patient.

Have Calcium Chloride replacement order: 20 mg/kg/dose PRN for ionized calcium < 4.5 mg/dL.

Vital sign monitoring: per PICU unit protocol
- Patient will remain intubated throughout the procedure to assist with the flow of the machine & help get the stem cells collected faster.

Post-Procedural:

- Extubation at the end of the collection will be at the discretion of the PICU attending.
- CBC with Diff (collected by the Apheresis team). **Decrease in hemoglobin, hematocrit, and platelet count is expected.**
  - Check results (PICU nursing) and notify PICU resident if platelets are < 50K or Hgb < 8 to obtain transfusion orders for irradiated products.
- **If the HPC target level is met, the apheresis catheter can be pulled.** It takes approximately 2 hours for the result to be known. If the level is below target, the procedure maybe repeated the following day.
  - A member of the Pediatric BMT team will provide the official word to the PICU nurse and Fellow/Attending as to whether enough stem cells were collected and if temporary line can be removed or a second day of collection is needed.
- **If catheter can be pulled, make sure that platelets are either greater than 50K or a platelet transfusion has been given.**
- Patient will remain hospitalized overnight for observation either in the PICU or transferred to the floor.
  - Discharge instructions should include site care where the temporary line had been.
  - GCSF and plerixafor will be discontinued upon completion of collection. Patient will not be discharge home on GCSF or plerixafor.
  - If the patient has been hospitalized for any additional reason besides collection, the Pediatric Hematology/Oncology (PMH) service line should be involved in the discharge process.

- If infusion is present, please remove prior to discharge.
- If port is accessed, please de-access prior to discharge.
- The pediatric BMT team will check on the patient/family each day of the collection and also keep in contact with the PICU nurse/fellow/attending.
References (on the Pediatric BMT website: Departments → Bone Marrow Transplant and Cellular Therapy → Peds BMT)

- Logistical Guidelines for Apheresis
- UNC Apheresis Lines
- Pediatric Sedation Policy for Non-Anesthesiologists (ADMIN 0212)