

Preparing Patients for an Allogeneic Transplant

RACHEL GOLDING, RN, BSN, BMTCN

LILA QUINN, RN, BSN, OCN

ABRAMSON CANCER CENTER

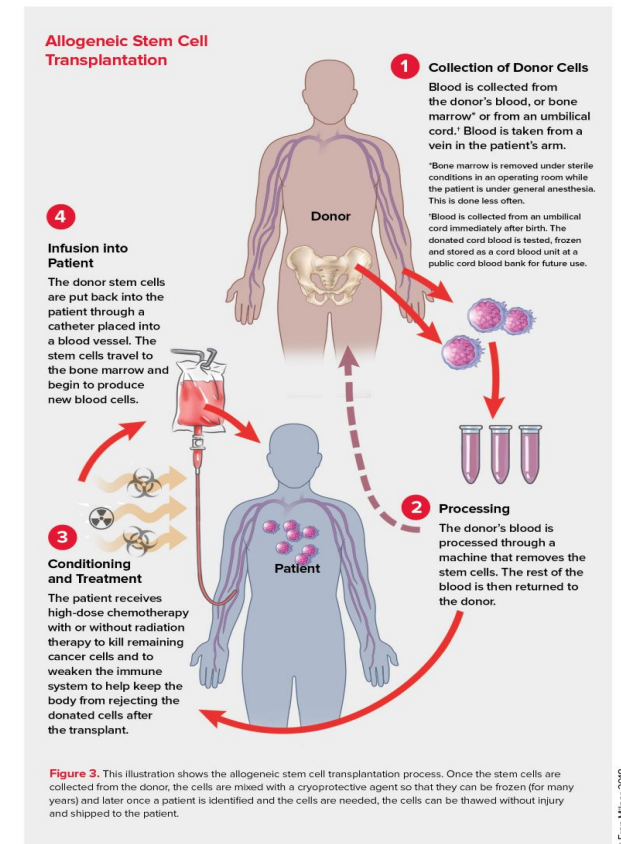
UNIVERSITY OF PENNSYLVANIA

Disclosures

None

Overview of Allogeneic Transplantation

- Allogeneic Transplantation- transferring stem cells from a healthy person (the donor) to the patient's body after chemotherapy and/or radiation
 - **Conditioning regimen**- given to weaken patient's immune system to keep the body from rejecting donated cells after transplant; allows donor cells to move through bloodstream to the bone marrow, where donor cells "engraft"
 - Donor cells create new immune system after engraftment; this new immune system can potentially provide long term cure through **graft-versus-tumor effect**
- Types of Transplant
 - Reduced Intensity- uses lower, less toxic doses of chemotherapy (+/- radiation)
 - Myeloablative (Full Intensity)- high dose therapy has added benefit of killing any remaining cancer cells in the body
- Donor
 - Related donor- sibling, children, and parents
 - Unrelated donor
 - Umbilical cord blood unit
- Stem cell source
 - Peripheral blood stem cell collection (PBSC)
 - Bone marrow harvest
 - Umbilical cord blood unit

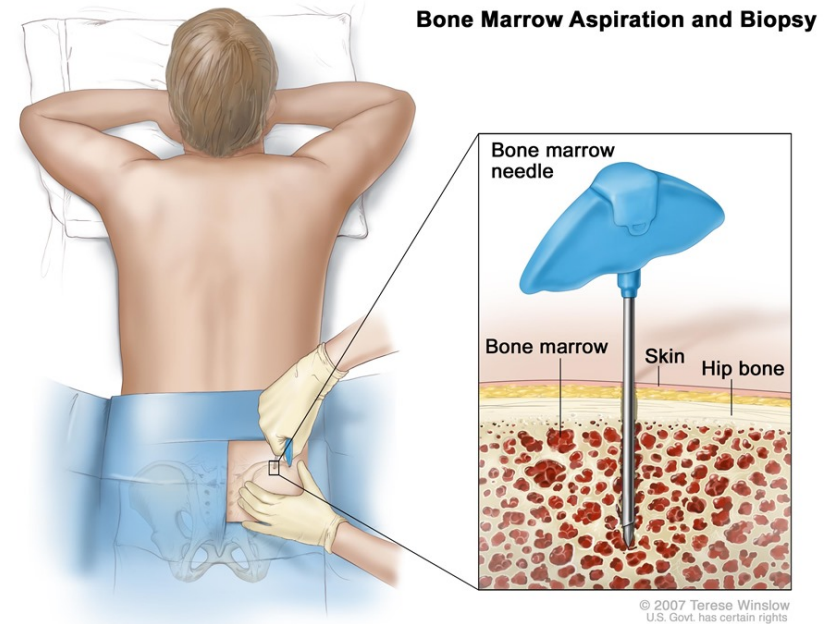


Donor Stem Cell Collection

PERIPHERAL BLOOD STEM CELL

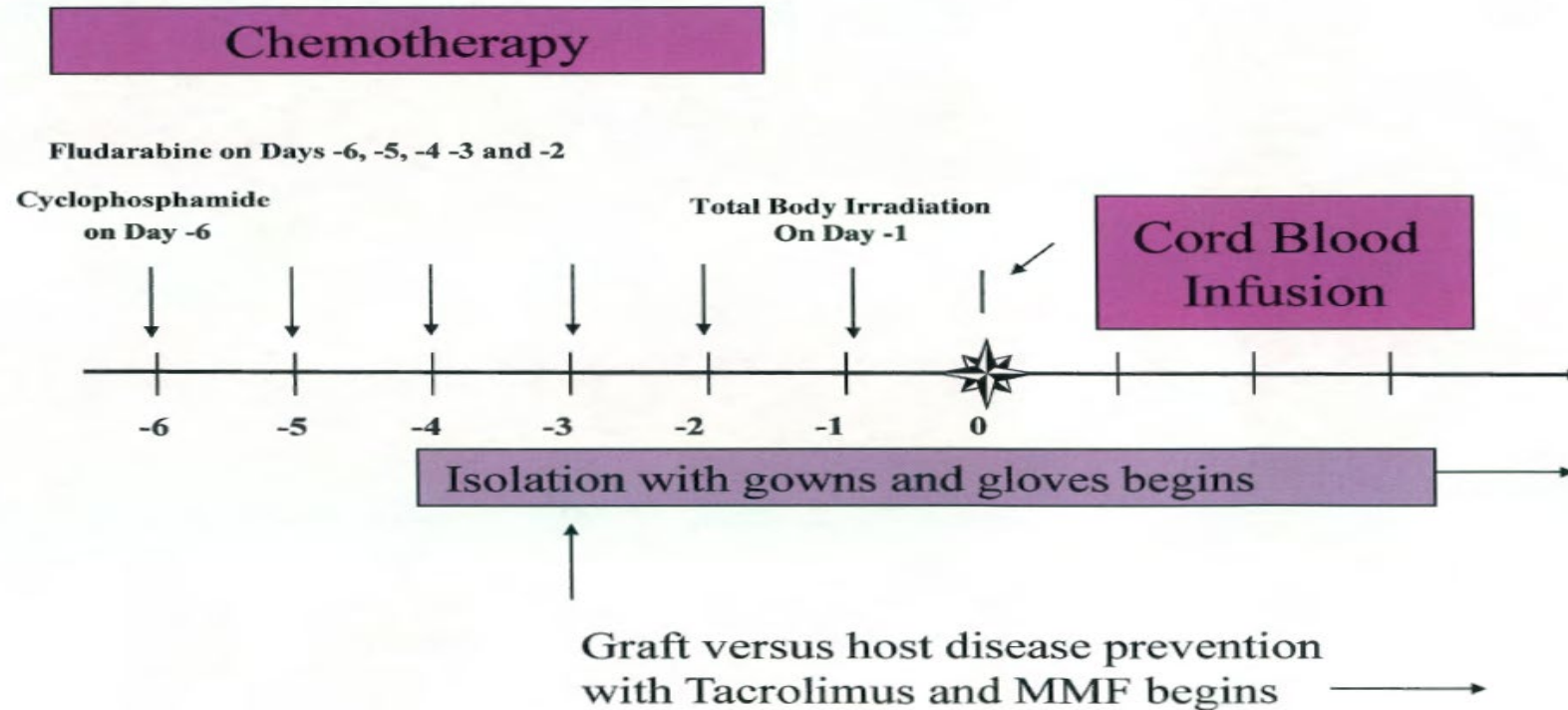


BONE MARROW HARVEST



Sample Cord Blood Treatment Plan

Cord Blood Treatment Plan
Nonmyeloablative Flu/Cy/TBI
University of Pennsylvania



Donor Identification:

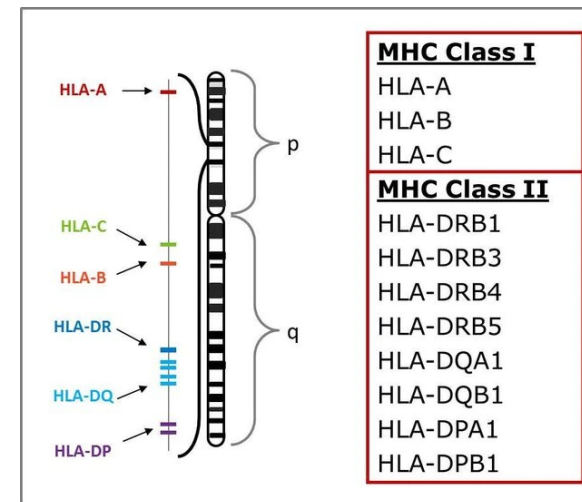
DONOR SEARCH:

1. HLA Typing/HLA Antibody screen of patient
2. HLA Typing of full siblings, adult children, parents (if under the age of 65)
3. Preliminary unrelated donor search through NMDP
4. Cord blood search
5. Formalize unrelated donor search

ORDER OF PREFERRED DONORS:

1. Fully matched (10/10) sibling
2. Fully matched (10/10) unrelated donor

Up for debate... haploidentical related donor vs. cord vs. 9/10 mismatched unrelated donor



Preparing Related Donors for Collection

Local Related Donors:

- Donor Evaluation- within 30 days of collection
 - Infectious Disease Markers
 - Physical exam/health history
 - Consent
 - If PBSC → injection teaching (Neupogen)/apheresis evaluation
- Schedule collection on Day -1 or Day 0
 - PBSC → in apheresis
 - BM Harvest → in OR under general/spinal anesthesia

NMDP Related Donor Services:

- Utilized for donors who cannot travel to our center → collected locally
- Domestic donors- collected on Day -1
- International donors- collected on Day -2 to allow for travel

Preparing Unrelated Donors for Collection

- Submit donor work-up request
- Donor center reaches out to donor → perform information session
- Physical Exam
 - Infectious Disease Markers
 - Health History Screening Questionnaire
 - Cleared for BM, PBSC, or both
- Schedule stem cell collection
 - Domestic donors → Day -1 collection
 - International donors → Day -2 collection
- Collected stem cells travel to our center with a courier

Preparing Cords for Shipment

- Selecting cords
 - Not as matched as living donors
 - Size
 - TNC and CD34 Count- determined based on patient's weight
 - Typically use two cords for adult recipients
- Ordered and shipped prior to patient admission
- Stored in stem cell lab until infusion

Preparing Patients for Transplant

○ Required Testing:

- ECHO, EKG, PFTs, chest x-ray, IDMs, confirmatory HLA typing, engraftment, bone marrow biopsy (if appropriate), PET scan/other scans (if appropriate), dental exam

○ Appointments

- Radiation consult, if appropriate
- Transplant Class- currently virtual
- Pre-transplant clinic appointment- sign consents

○ Transplant Schedule

- Admit day before chemotherapy begins; coordinate with other calendars:
 - Stem cell lab availability
 - Radiation schedule
 - Pharmacy- busulfan levels
 - Donor schedule
- Schedule line appointment
- Pre-transplant COVID Testing

Transplant Coordinator Role

○ Patient & Caregiver Education

- Overview of transplant process
 - Pre-transplant prep/apts
 - Inpatient admission
 - Post-discharge care for patient and caregivers

○ Transplant Class

- Required class for patients & caregivers ~1-2 weeks prior to transplant admission

○ Transplant Schedule

- Admission date, line apt, chemotherapy (+/- radiation) schedule, stem cell infusion, immunosuppression, etc.
- Individual transplant calendar for patient
- Keeping team updated on schedule/plan

○ Donor Selection

- Weekly meeting with program director and HLA lab director
- Review potential donors and cords to identify best options
- HLA antibodies - preformed antibodies directed against foreign HLA antigens
- Updating provider

○ HLA Desensitization

- Process utilized to decrease DSA prior to transplant
- Immunosuppression and IVIG/plasmapheresis scheduled pre-transplant

Case Study:

Background: OM is a 48 year old Spanish-speaking female with a history of breast cancer in 10/2018. Found to have therapy-related mixed phenotype acute leukemia in 02/2020. Donor search initiated; patient confirmed to be in remission in 03/2020.

Pre-transplant Course:

- Donor search started 03/2020-
 - Preliminary unrelated donor search completed- 0 potential complete matched donor
 - No good cord options- high level DSA
 - Multiple related donors HLA typed (siblings, half-siblings, children)
 - 0 full matches- several haploidentical related donor options
- **Donor #1-** Half-brother (JM) chosen
 - Haploidentical match, in good health, local to the area
 - Patient found to have high level DSA to all related donors; JM donor work-up canceled
- **Donor #2-** Unrelated donor chosen
 - 9/10 mismatch- mismatch at A with no DSA
 - Unrelated donor work-up started; due to COVID, delays in collection dates
 - Transplant admission planned for 10/2020- patient COVID positive on day of transplant admission- transplant and donor collection canceled
 - Patient recovered from COVID, transplant admission rescheduled for 01/2021- unrelated donor required repeat physical evaluation due to delay; no longer cleared after this evaluation- transplant canceled and donor search re-initiated

Case Study:

Background: OM is a 48 year old Spanish-speaking female with a history of breast cancer in 10/2018. Found to have therapy-related mixed phenotype acute leukemia in 02/2020. Donor search initiated; patient confirmed to be in remission in 03/2020.

Pre-transplant Course (con't):

- Donor search #2 in 01/2021-
 - Reviewed all cords and unrelated donors options again- no viable options
 - Requested HLA lab to re-run current HLA antibody screen against all potential related donors
 - Patient's antibody levels decreased significantly over past year- two half-brothers (WD and EM) with low DSA identified- ABO/CMV checked
 - Will require HLA desensitization
- **Donor #3-** Half-brother (WD) chosen
 - Haploidentical match- utilized NMDP RDS to request local collection in Ohio
 - Did not clear eval- transplant and collection canceled
- **Donor #4-** Half-brother (EM) chosen
 - Haploidentical match- utilized NMDP RDS to request local collection in California
 - Donor cleared evaluation and scheduled for collection
 - OM scheduled for HLA desensitization and transplant admission
 - DSA checked throughout desensitization and decreased appropriately
 - Patient admitted for transplant 4/2/2021

Sources:

<https://www.lls.org/treatment/types-of-treatment/stem-cell-transplantation/allogeneic-stem-cell-transplantation>

<https://bethematch.org/>

<https://www.bmtinfonet.org/>

https://www.lls.org/sites/default/files/file_assets/cordbloodstemcelltransplantation.pdf