TRAINING UPDATE

Lab Location:	SGAH and WAH	**Date Implemented:**	6.3.2014
Department:	Blood Bank	**Due Date:**	6.8.2014

DESCRIPTION OF PROCEDURE REVISION

Name of procedure:

HLA-matched Platelet Products

Description of change(s):

1. We used to have one procedure titled, "HLA-Matched and Crossmatched Platelet Products." These were separated into 2 separate procedures given new changes to the HLA-matched platelet process.

2. We will now BCP platelet products from a regular platelet to an HLA-matched platelet using code "HE####."

3. Like other component prep functions, this will print a new label for the product and a label check will be required.

4. The BCP should not be done until we are sure the intended recipient will be transfused. We CANNOT bill a patient who does not need HLA-matched platelets for HLA-matched platelets.

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Non-Technical SOP

Title	**HLA-Matched Platelet Products**	
Prepared by	Stephanie Codina	Date: 05.22.2014
Owner	Stephanie Codina	Date: 05.22.2014

Laboratory Approval		
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		
Local Issue Date:	Local Effective Date:	

Review:		
Print Name	**Signature**	**Date**

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1. PURPOSE

HLA-matched platelet products are used to treat patients that have become refractory to platelet transfusions due to the presence of HLA or platelet specific antibodies. This procedure outlines the process for obtaining HLA-matched platelet products for transfusion.

2. SCOPE

Platelets bear a variety of antigens, including HLA and platelet-specific antigens. Patients who have been transfused may develop antibodies towards platelet antigens. When platelets are transfused to a patient with an antibody directed towards an antigen expressed on the platelets, the survival time of the transfused platelets may be markedly shortened. Platelet survival is improved when the transfused platelets match the HLA type of the recipient **or** lack the HLA antigens that correspond to the recipients HLA antibodies. HLA-matched platelets require additional time for preparation and orders should be coordinated with the blood supplier.

3. RESPONSIBILITY

All Blood Bank staff must understand and adhere to this procedures when providing HLA-matched platelets for transfusion.

4. DEFINITIONS

Platelet Transfusion Refractoriness - When the recipient experiences a "less-than-expected" increase in platelets following a platelet transfusion. Platelets can be destroyed by immune mechanisms (HLA and platelet-specific antibodies) or non-immune mechanisms (splenomegaly, sepsis, fever, intravascular devices, and DIC). A 1-hour post-transfusion platelet count should be used to differentiate between immune-mediated and non-immune-mediated destruction. Immune refractory states will demonstrate poor recovery in the early post-infusion interval.

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Corrected Count Increment (CCI) - A calculation used to determine the recipient's response to platelet transfusion. A 1-hour CCI >7500 indicates an adequate response to platelet transfusion, while a CCI <5000 on two separate occasions indicates platelet refractoriness. CCI values that are adequate 1 hour post transfusion and continue to decrease are more suggestive of non-immune causes (splenomegaly, fever, infection, DIC, amphotericin B use, bleeding, etc.). Neither crossmatched nor HLA-matched platelets are needed for non-immune platelet destruction.

$$CCI = \frac{\text{Body Surface Area } (m^2) \times (\text{Post Transfusion Platelet Count} - \text{Pre Transfusion Platelet Count}) \times 10^{11}}{\text{Number of Platelets Transfused}}$$

HLA-Matched Platelets – Both the donor and recipient are tested for HLA antigens. The antigens are matched for HLA-A and-B locus as best as possible. If the patient has HLA antibodies, donor platelets that lack the corresponding antigen are also selected. HLA-matched platelets provide more successful transfusion response in up to 75% of patients with immune-mediated refractoriness.

5. PROCEDURE

Step	Action
1	All initial requests for HLA-matched platelets should be approved by the Blood Bank Medical Director or clinical pathologist on-call. A. Approval or rejection should be documented in the Blood Bank Communication Log. Include the date, time, and pathologist's name. B. An HLA antibody screen should be ordered the first time HLA-matched platelets are ordered. a. If positive, HLA antibody identification should be performed. b. If negative, other causes of immune-mediated platelet destruction should be considered (such as platelet antibodies). Contact the blood supplier for guidance. C. Once HLA-matched platelet products are approved, all subsequent platelet transfusions will meet the HLA-matched transfusion criteria. D. HLA-matched platelet products are not normally stored in inventory and must be coordinated with the blood supplier.
2	Notify the ordering provider that there may be a time delay. It may take up to 5 days to obtain HLA-matched platelets.
3	Document the need for special platelet transfusion by placing a comment in the patient's blood bank administrative data file. Enter ";HLA" for the comment "Irradiated and HLA matched platelets required."
4	Obtain a properly-labeled 10mL EDTA and/or ACD sample for testing.

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Step	Action
5	Complete the ARC "Histocompatibility Testing Requisition" form. A. For HLA typing, order test HLA 072, HLA-A and B Typing For Platelet Transfusion B. For HLA antibody screen, order test HLA 025, HLA Antibody Screen for Transfusion, Class I C. Order both tests for refractoriness.
6	Photocopy the requisition form and place the copy in the reference lab billing file.
7	Submit the sample and request form to the reference lab per procedure. Place a BBREF order prior to sending the sample to the reference lab for testing.
8	A. When HLA results are returned, enter the patient's HLA type into the blood bank historical data file. B. Fax a copy of the result to the ARC order management department to obtain HLA-matched platelet products.
9	The blood supplier will send the platelets when available. Enter the platelets into inventory per procedure.
10	Irradiate the platelet product. **All HLA-matched platelet products MUST be irradiated prior to transfusion. Irradiate upon arrival if ARC did not irradiate prior to shipment.**
11	Immediately before transfusion, convert them from regular platelets to HLA-matched platelets in Sunquest. A. Access Sunquest function "Blood Component Preparation." B. At the "Value" prompt, enter the function that corresponds to the platelet product that his HLA-matched. This is generally H + the E code of the platelet product. Refer to Appendix A for additional information. C. Press the tab key to default the current date and time. D. Click the "continue" button. E. A second "Blood Component Prep" screen will appear. a. At the "Unit #" prompt, scan the unit number DIN of the platelet unit. b. At the "Component" prompt, scan the product code from the platelet unit. This will autofill both the product code and division fields. F. Click the "Save" button. G. A "Preview Output / New Units" screen will appear. Review the information to ensure accuracy, then click on the "finish" button to generate new product/expiration date labels for the HLA-matched product. H. Perform a blood label check of the HLA-matched platelet product in Sunquest per procedure.

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Step	Action
12	Allocate the HLA-matched platelet product to the designated recipient using Sunquest function, "Blood Order Processing." A. Access Blood Order Processing. B. Open the TPP order from the order list. C. Review the order, indications, and provider instructions. D. Enter the recipient's blood bank armband number in the "Armband #" field. E. Click the "Allocation" tab. F. At the "Unit #" prompt, scan the unit number from the HLA-matched platelet product. G. At the "Component" prompt, scan the C code from the product. This will autofill the component and division fields. H. Click the "Select" button to allocate the unit to the recipient. I. Each HLA-matched platelet unit will display in the "Compatibility Testing" area of the screen. In the "TS" column, enter "]" for each unit to indicate the unit is acceptable for transfusion to the patient. **Do not allocate units that do not meet specifications.** J. Click the "Save" button. K. The message, "Continue to Blood Product Issue?" will appear. a. Click "Yes" and continue issuing per procedure if the platelet will be released immediately. b. Click "No" if the platelet will be stored in the blood bank prior to issue.
13	For units that were not issued, attach the printed patient information and store in the platelet rotator (20-24°C) until issue or expiration.
14	Notify a supervisor if HLA-matched platelets are issued to a patient who does not require HLA-matched platelets so billing may be adjusted.

6. RELATED DOCUMENTS

SOP: Entering Special Transfusion Attributes into the LIS
SOP: Reference Workup for Antibody Identification
SOP: Entering Blood Products Into Inventory
SOP: Issuing Blood Components
Form: American Red Cross Histocompatibility Testing Requisition

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7. REFERENCES

1. Roback, J.D., Grossman, B.J., Harris, T., and Hillyer, C.D. 2011. Technical Manual of the AABB, 76th ed. AABB Publishing, Bethesda, Maryland.
2. Standards for Blood Banks and Transfusion Services, 2014. AABB, 29th ed. AABB Publishing, Bethesda, Maryland.
3. AABB, ABC, ARC, and ASBP. 2009. Circular of information for the use of human blood and blood components.
4. Vassallo, R. R. 2008. Changing Paradigms in Matched Platelet Support. American Red Cross.

8. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By

9. ADDENDA AND APPENDICES

Appendix A: HLA-Matched Platelet Component Preparation Functions
Appendix B: Matched Platelet Support Pathway

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Appendix A
HLA-Matched Platelet Component Preparation Functions

Original Product Code	Component Prep Function	Final Product Code (Irradiated)
E3077	HE3077	C3046
E3087	HE3087	C3056
E3088	HE3088	C3057
E3089	HE3089	C3058
E4643	HE4643	C4647
E4644	HE4644	C4648

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American Red Cross

Blood Services

Matched Platelet Support Pathway

v. 03132008

Percent Predicted Recovery (PPR)

$$PPR\ (\%) = \frac{\text{observed increment } (x10^9/L)}{\frac{\text{\# plts. txf'd } (x10^9)}{\text{blood volume (L)}}}$$

Gilcher's Rule of 5s for blood volume (mL/kg):

	Obese	Thin	Normal	Muscular
Male:	60	65	70	75
Female:	55	60	65	70

Corrected Count Increment (CCI)

$$CCI\ (m^2/\mu L/10^{11}) = \frac{\text{increment } (/\mu L) \times BSA\ (m^2)}{\text{\# plts. txf'd } (x10^{11})}$$

Is the patient platelet refractory?
(Inappropriately low increments after ≥2 successive doses of ABO-identical platelets: 18 – 24 hr. post-tfxn. increment <9,000 - 10,000/μL or CCI <5,000 or PPR <20%)

↓

Perform 1-hour post-tfxn. EDTA platelet count
(10 min. – 4 hr. sample) Calculate CCI or PPR.

↓

Adequate 1 hr. CCI or PPR?

NO → CCI <7,500 or PPR <30%

↓

Potential immune refractoriness

Immunized patients tend to have both markedly shortened post-transfusion platelet recovery (1 hr.) and survival (18 – 24 hr.).

↓

(See other side for pathway)

YES → CCI ≥7,500 or PPR ≥30%

↓

Continue support with ABO-matched platelets. Consider non-immune causes of poor 18 – 24 hr. increments.

Most non-immune causes of platelet destruction have a greater effect on platelet survival (18 – 24 hr.) than recovery (1 hr.) [except significant splenomegaly and brisk hemorrhage].

Nonimmune causes of refractoriness include: splenomegaly, fever/infection, DIC, s/p BMT, SOS/VOD, amphotericin B use, bleeding, platelet deterioration w/ storage.

Most alloimmunization occurs against Class I Human Leukocyte Antigens (HLA-A & HLA-B loci), with occasional Human Platelet Antigen (HPA) co-immunization, or rarely, HPA-only alloimmunization (e.g., HPA-1b, HPA-5b, etc.).

Likelihood of successful transfusion for HLA-alloimmunized patients (in descending order):

1. HLA-identical platelet selection
   (A/BU matches when available; selective recruitment for pts. w/ broad alloimmunization)
2. HLA antigen-negative units or platelets compatible by crossmatching
3. HLA type-selected non-identical matches (well-chosen BX, BUX and C matches)
4. ABO-identical whole blood-derived or apheresis platelets when HPA and/or HLA work-up is pending & crossmatches are unavailable

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