

REFERENCE: PL-524
SUPERSEDES: January 2008
ORIGINATED: January 2008
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**POLICIES/PROCEDURES
MILLER CHILDREN'S HOSPITAL LONG BEACH**

SUBJECT:
BLOOD AND BLOOD COMPONENTS: EMERGENT
OR MASSIVE TRANSFUSION PROCEDURE (MTP): ADULT

REVISED:
November 2012

By: Patient Care Services;
Blood Bank

AUTHORITY:
Joint Commission Comprehensive Manual for Accreditation of Acute Care Hospitals; AABB Standards; Code of Federal Regulations; College of American Pathologists (CAP) Standards; State of California Biologics Regulations

PURPOSE:
To ensure quality patient care by providing an expedited process to obtain an appropriate mix of blood and or blood components for a patient who is experiencing significant blood loss or an emergent transfusion. To facilitate the ordering and release of blood products in an emergent situation in the most timely and efficient manner. To outline the process of providing rapid restoration of intravascular blood volume, maintain oxygen carrying capacity, and coagulability of the blood.

- SCOPE AND RESPONSIBILITY:**
- A. **Scope:** This procedure applies to adult patients with an order for the Massive Transfusion Procedure or an emergent transfusion when cross matched units are not available.
 - B. **Responsibility:** The Physician or his/her designee is responsible for ordering blood or activating the Massive Transfusion Procedure (MTP) by contacting the Blood Bank (BB). Compliance with this procedure is the responsibility of licensed staff.

POLICY:
Emergency transfusions/the MTP will be initiated by the Physician if clinical indications exist, in order to prevent complications associated with large blood volume replacements. The MTP is indicated for a critically-ill patient likely to require the rapid transfusion of greater than 6-10 units of blood and blood components within two hours, and has the potential to progress to consumptive coagulopathy and uncontrolled hemorrhage.

PROCEDURE:

I. EMERGENCY TRANSFUSIONS

When blood is urgently needed and cross matched units are not available, CALL BLOOD BANK, Ext. 30815. Specify the following:

- Patient's name and medical record number
- Patient's location
- Number of units and type of component needed.
- Ordering physician's name

The Blood Bank will supply the most compatible blood, based on the blood type information currently available for the patient.

- A. IF NO CURRENT TESTING AVAILABLE: Un-crossmatched O negative (for female patients of child bearing age) or O positive (male patients) Red Blood Cells will be delivered as quickly as possible. .
- B. IF ABO/RH TYPE KNOWN FROM CURRENT TESTING: Type specific uncross matched Red Blood Cells will be delivered.
- C. IF TYPE AND SCREEN CURRENTLY AVAILABLE: Type specific packed cells will be delivered.
- D. In all of the above instances, crossmatching will be completed as rapidly as possible and any incompatibility will be reported to the nurse/physician by phone/intercom. BEDSIDE PATIENT IDENTIFICATION remains an extremely important step prior to transfusion. The attached armband with the patient name and medical record number MUST be compared with label on the blood component and found to be identical before starting the transfusion.
- F. When uncrossmatched Red Blood Cells are delivered, Blood Bank will place an EPIC order: "Emergency Release of RBC's This order will be signed by the ordering physician as soon as time permits.

II. MASSIVE TRANSFUSION PROCEDURE (MTP)

A. Initiation of MTP:

1. Physician or designee will initiate the MTP by verbal or telephone order if he/she deems it necessary, after a clinical evaluation of the patient. This evaluation can occur upon patient arrival into the Emergency Department (ED), in the Operating Room (OR), or in the Intensive Care Unit (ICU).
2. The Physician or his/her designee is responsible for contacting the BB and activating the MTP. An order should be given and timed on the chart to document initiation of the MTP.

B. Blood Bank Response:

The goal of this procedure is to transfuse a 1:1 ratio of packed red blood cells (RBC's) to fresh frozen plasma (FFP), and to transfuse 1 unit of platelets (PLTs) for every 6 units of FFP and RBC's. When the MTP is initiated by physician order, the Blood Bank will do the following:

1. Immediately deliver 4 units of uncrossmatched RBC's, 4 units of FFP and 1 unit of platelets to the patient location.
2. Complete type, antibody screen and crossmatch of 4 uncrossmatched units delivered as in step A.
3. Continue crossmatching RBC's, thawing FFP, and preparing platelets to "keep ahead" products as follows: also shown in the table below.
4. The BB will automatically deliver the Initial Response (Pack 1) after the MTP is activated. Pack 2 will be automatically delivered as soon as it is available. After Pack 2, the BB will wait for a call from the Physician or designee on whether to continue preparing and delivering MTP Packs.

Blood Bank Initial and Keep Ahead Response

	Initial Response (Pack 1)	(Pack 2)	Keep Ahead
RBC's	4	6	6
FFP	4	6	6
PLTs	1	1	1

5. Prepare cryoprecipitate pools as ordered.
6. The Blood Bank will continue to thaw FFP in a 1:1 ratio with RBC's and prepare platelets until instructed to stop by the ordering physician, anesthesiologist, or his/her designee.
7. The Blood Bank will also place an "Activate Massive Transfusion Procedure / Protocol" order in EPIC for the physician to sign whenever EPIC is accessed.

C. Transfusionist Response

1. Notify BB after Pack 2 if additional packs need to be prepared.
2. Draw labs as indicated. Include a CBC, PT, PTT and FIB (fibrinogen). (All of these tests can be ordered at once as an Acute Bleeding Panel in EPIC for patients where EPIC is accessible).
3. Order cryoprecipitate from Blood Bank as needed, based on lab results. Utilize the guidelines in section IV. to determine transfusion amounts.
4. If possible, continue to draw acute bleeding panel and ionized Calcium level after every 6 RBC transfusions (after each pack is completely transfused).
5. All blood products will be administered through a large bore intravenous catheter via a warming device or rapid infuser.
6. Monitor temperature every 30 minutes to help prevent hypothermia. In addition to using a warming device for blood infusion, utilize a warming blanket and other measures as necessary.
7. Continue to monitor CBC, PT, and PTT for a minimum of every 8 hours for 24 hours after termination of the MTP, or more frequently if the patient's condition warrants.
8. Notify the Blood Bank if the patient is transported to another area in the medical center during the MTP process (i.e., radiology, OR, ICU).
9. Return unused blood products to the Blood Bank as soon as possible to prevent wastage.

D. Maintenance of MTP

1. The Physician will utilize the lab (fibrinogen) results to guide cryoprecipitate transfusion decisions. Fibrinogen levels below 100mg/dL should be corrected using the table below with the goal of maintaining a fibrinogen level greater than 100mg/dL. Consider maintaining a level of at least 200 mg/dL in patients with complex coagulopathy.
2. Guideline recommendations are as follows:

<i>Blood Product</i>	<i>Lab Value</i>	<i>Blood Product Amount</i>
Cryoprecipitate	Fibrinogen <50	30 units
	Fibrinogen <100	20 units
	Fibrinogen 100-200	10 units

E. Medication Considerations for massive bleeding

1. Tranexamic Acid (TXA)

- a. In the presence of diffuse non-surgical bleeding with continuous blood product utilization requirements, TXA (an anti-fibrinolytic agent) should be considered.
 - b. Dosing for TXA in trauma associated hemorrhage:
 - i. Loading dose: 1gm infused over 10 minutes (mix in a 50 ml NS bag)
 - ii. Maintenance dose: 1 gm mixed in 250ml NS infused over 8 hours. Begin immediately following loading dose.
 - c. Hypotension is a potential adverse effect. Infusion rate must be limited to 100mg/minute.
2. Prothrombin Complex Concentrate: Factor IX (Profilnine)
- a. In the presence of life threatening bleeding with, known warfarin (Coumadin) use, and an elevated INR, Profilnine should be used to rapidly reverse the effects of warfarin (Coumadin).
 - b. Dosing for Profilnine in trauma associated hemorrhage:
 - i. Loading dose: Weight-based dose of Factor IX Complex (Profilnine[®])
 - a.) Weight < 90 kg: 2000 units x 1
 - b.) Weight ≥ 90 kg: 3000 units x 1
 - ii. Repeat dose
 - a.) If repeat INR ≥ 3: 2000 units x 1 and recheck INR in 15 minutes
 - b.) If repeat INR < 3: 1000 units x 1 and recheck INR in 15 minutes
- F. Termination of the MTP
- 1. The MTP must be terminated by the ordering physician or his/her designee. This termination occurs when the physician notifies the Blood Bank via telephone.
 - 2. The nurse or designated recorder/scribe is responsible for documenting the termination of the MTP in the patient's chart.
 - 3. All Trauma patients who receive the MTP will be subject to Performance Improvement review to assure quality is maintained. Quality indicators will include: timeliness of blood product delivery and utilization, appropriateness of products used as per MTP guidelines, wastage, adjunct use (warmer, infuser), development of hypothermia, and documentation.

REVIEWED/APPROVED BY:

Pathology Department	August 2012
Trauma Service	September 2012
Clinical Policy & Procedure Committee	October 2012
Nursing Executive Council	October 2012
Medical Executive Committee	November 2012