

The Mount Sinai Medical Center
1450 Madison Avenue, New York, NY 10029
Transfusion Medicine – Cellular Therapy: Blood Bank

Blood Bank –Massive Transfusion Protocol

	Name, Position	Signature	Date
Author:	Jeffrey S. Jhang, MD Medical Director		
Approving Authority:	Patricia Galdon QA Manager		
Approving Authority:	Jeffrey S. Jhang, MD Medical Director, Blood Bank		
Approving Authority:	Ila Singh, MD, PhD Medical Director, Clinical Laboratory Services		
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Annual Review/ Revisions

Date	Signature	Date	Signature

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Blood Bank –Massive Transfusion Protocol

Purpose

To define the process by which the Blood Bank will respond in the event of a massive hemorrhage / bleeding emergency in the Operating Room, Labor and Delivery, Emergency Department, ICUs and other care areas.

Principle:

Massive transfusion can be defined as a one blood volume transfusion over 24 hours, 50% of blood volume in 3 hours, ongoing blood loss > 150 ml/min, replacement of > 10 RBC units in 24 hours, >4 units in <4 hours, or reasonable expectation of continued profuse bleeding, and is most often associated with trauma, solid organ transplant, obstetrical emergencies, and surgical complications.

Timely replacement of volume and oxygen carrying capacity in these situations is critical. However, due to the unexpected nature of these bleeds, providing blood products quickly without sacrificing patient safety is often a challenge. Furthermore, emerging evidence suggests volume resuscitation using a 1:1:1 ratio of packed red blood cells, plasma, and platelets improves patient survival (Shaz *et al*, 2009). Therefore, when a Massive Transfusion Event is called, the Blood Bank staff should work as fast as possible to supply blood products in the ratios described in this policy.

Scope:

This protocol applies to **unexpected** massive transfusions in the emergency department, operating room, labor and delivery, or on patient floors at Mount Sinai Hospital.

Specimen Collection: N/A

Specimen Handling: N/A

Reagents, Equipment, Calibration, Quality Control: N/A

Procedure

1. Initiation of Massive Transfusion Protocol (MTP)

A. Only a physician or physician appointed designee can initiate the MTP.

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- B. A designee must be a licensed medical practitioner (i.e. MD, RN, NP, PA)
- C. The patient must be currently exsanguinating and the criteria for a massive transfusion (i.e. one blood volume transfusion over 24 hours, 50% blood volume in 3 hours, ongoing blood loss >150 ml/min, or >10 pRBC units in 24 hours) must be anticipated or met.
- D. Blood Bank Notification:
1. NOTE: Only a physician or physician appointed designee can initiate the MTP
 2. A designee must be a licensed medical practitioner (i.e. MD, RN, NP, PA)
 3. The following information will be provided to the Blood Bank Staff
 - a) Patient name, MRN, location
 - b) Patient diagnosis
 - c) “Initiating Physician” or designee name and contact number
 4. The technologist will notify the “Initiating Physician” or designee that:
 - a) You have activated the MTP.
 - b) A Massive Transfusion Pack containing 4 units packed red blood cells, 4 units thawed plasma, and 1 single donor platelet will be set up immediately. 1 unit of pooled cryoprecipitate will be immediately thawed.
 - c) Products will be sent using the pneumatic tube
 - d) The second MTP Pack will be set up immediately after the first set is delivered by pneumatic tube
 - e) A phone request for the next MTP pack to be sent by pneumatic tube can be made when the previously issued products are nearly exhausted
 - f) If the pneumatic tube is not available, then products can be picked up at the blood bank
 5. The technologist will notify the supervisor and blood bank resident that a MTP has been initiated. If the on-call blood bank resident cannot be reached within 5 minutes, then technologist will notify the on-call blood bank attending physician.
 - a) A supervisor or the most senior tech will assign one designated staff member to coordinate the issuing of blood products, and tracking of blood requests for the obstetric emergency case.
 - b) The following information will be provided to the on-call blood bank physician:
 - (1) Patient name, MRN, location
 - (2) Patient diagnosis

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- (3) “Initiating Physician” or designee name and contact number
- (4) If known, the patient’s
 - (a) ABO Type and RhD Type
 - (b) Current antibody screen
 - (c) History of alloantibodies

2. On-call blood bank physician will contact with the “Initiating Physician”

- A. Confirm the patient’s name, MRN, and location
- B. Confirm the diagnosis and clinical status
- C. Provide direct contact number information such as cell phone or home phone number
- D. Review the basic guidelines of MTP:
 - 1. If not already sent, laboratory studies should be submitted to the laboratory. This should include CBC with platelets, PT/INR, aPTT, Fibrinogen, D-dimer, pH (if Novoseven RT is to be administered)
 - 2. 4 units of packed red blood cells (PRBC), 4 units of thawed plasma, and 1 dose of single donor platelets will be available in the blood bank at all times
 - 3. Plasma and cryo takes 30 minutes to thaw, so may be delayed at times, just request that products be sent by pneumatic tube or send transport to pick up products.
 - 4. After every 2 MTP packs, follow up will be made between the Blood Bank Staff and/or the on-call blood bank physician and the “Initiating Physician” to determine the efficacy of the released product, the need for continuation of the massive transfusion protocol, and if there is a need for additional products.
 - 5. After MTP pack #2, subsequent packs will not have cryoprecipitate. Cryoprecipitate will have to be ordered separately after pack #2.
 - 6. Remind initiating physician or designee to assign one person to call the blood bank. Multiple calls from the floor only delays provision of blood products and other cases requiring blood.
 - 7. If the clinical team has any questions or problems, call the blood bank, on-call blood bank resident or attending.

3. Blood Bank Staff Preparation and Issue of products

- A. The technologist will confirm the following:
 - 1. If the patient has a current type and screen and ABO confirmatory typing
 - 2. If there is sufficient patient sample for appropriate crossmatching

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3. If **either** condition is not met, the technologist will inform the “Initiating Physician” to draw 2 EDTA (pink top) samples for ABO typing, antibody screening, and crossmatching and 1 EDTA (pink top) sample for ABO confirmatory typing., as applicable.
- B. If the patient does not have an active type and screen or if the patient cannot wait for crossmatched units, then follow the Emergency Blood Release procedure (SOP #7 Emergency Release of Uncrossmatched Blood)
- C. If the conditions above are met, a massive transfusion pack will be immediately prepared:
 1. A **“massive transfusion pack”** consists of:
 - a) 4 units packed red cells
 - b) 4 units of plasma (thaw in water bath if not immediately available)
 - c) 1 dose of single donor platelets (equivalent to 6-8 units of random donor platelets)
 - (1) If plasma-compatible platelets are not available, platelets should be released in the following order:
 - (a) First Choice: AB
 - (b) Second Choice: A
 - (c) Third Choice: B
 - (d) Fourth Choice: O
 - d) 1 unit pooled cryoprecipitate (equivalent to 5 units of cryoprecipitate; thaw in waterbath if not immediately available). (NOTE: cryoprecipitate will be included only for MTP Pack #1 and #2).
 2. For a patient with a positive antibody screen:
 - a) If compatible pRBC cannot be quickly identified, the supervisor and on-call blood bank physician will direct the release of the most appropriate pRBCs
 - b) If no additional sample available for crossmatching:
 - (1) The “Initiating Physician” will be contacted for an additional sample
 - (2) Antigen negative pRBC will be released under emergency release
- D. The blood bank staff will then prepare a second massive transfusion pack containing 4 units PRBCs; 4 units plasma, 1 single donor platelets, and 1 pooled cryoprecipitate without additional requests from the Initiating Physician.
- E. After the second massive transfusion pack has been issued, the Blood Bank Staff will contact the Initiating Physician or designee and ask if the Massive Transfusion Protocol should continue. If the MTP is not canceled after MTP Pack #2, continue to prepare a MTP pack without cryoprecipitate and then prepare an additional one after each pack is sent until the MTP is canceled.

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1. If the Initiating Physician cannot be immediately contacted after MTP Pack #2, the next MTP pack should be immediately prepared
- F. Use of NovoSeven: If the patient continues to bleed, NovoSeven may be used.
 1. Maximum dosage is 90 µg/kg body weight, but most doses can start at 20 – 30 µg/kg, i.e. 1 or 2 mg vials issued.
 2. NovoSeven doses can be repeated every 2-3 hours if patient continues with massive bleeding.
 3. Notify Blood Bank Physician on call whenever NovoSeven is requested.
 4. NovoSeven©RT usage requires a specific request from the clinical team with consult and approval from the blood bank resident or attending
- G. Documentation of units issued – Each unit issued must be documented.
 1. The Blood Bank Staff will create a lab initiated order for a Massive Transfusion Protocol
 - a) This order will interface with EPIC so that the Electronic Medical Record has documentation of the verbal order for an MTP
 2. Techs can do a print screen of issued units from the SoftBank system and staple to the BB Form #701: ‘Emergency Blood Release / Massive Transfusion Protocol Form’.
 3. Alternatively, for each unit issued, affix one of the extra unit number stickers to the #701: ‘Emergency Blood Release / Massive Transfusion Protocol Form’.
 4. Submit completed blood bank form #701 for supervisory review
 5. If the computers or SoftBank is down, then handwritten unit numbers are permissible
4. **Blood Components**
 - A. Red blood cells – use group O neg for pediatric patients and women of childbearing age (unless patient has a confirmed blood type on record in which case type specific may be provided). Until blood type is confirmed, use O pos for women over age 50 and men.
 - B. Platelets – use ABO identical platelets if possible, otherwise use platelets according to C.1.c)(1)
 - C. Plasma – At least 6 units of thawed plasma are to be available at all times, group A. If patient is group B or AB, immediately begin thawing ABO compatible plasma.
 - D. Cryoprecipitate – use pooled cryo. ABO type is not significant. Do not send up individual cryo units unless pooled cryo inventory is depleted.
5. **Discontinuation of Massive Transfusion Protocol**
 - A. Initiating Physician or Designee

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1. A physician or RN from the OR, ED or ICU will notify by phone when the massive transfusion event is over.
 2. Unused blood components should be returned immediately to the Blood Bank
- B. The Blood Bank Physician will contact the Initiating Physician or designee periodically to determine if products are being provided without delay, to clarify any issues with the products, discuss and recommend additional products as necessary, and to determine if the MTP should be discontinued.
- C. The Blood Bank Staff or the Blood Bank Physician will contact OR, ED or ICU to ensure that Emergency Release / Massive Transfusion form has been completed.
- D. The Blood Bank Physician will determine how many of each blood product was actually transfused to the patient. This may require discussion with the clinical team, review of the medical record, review of anesthesiology records, or other supporting documents.

References:

Mount Sinai Medical Center TMCT Blood Bank Policy and Procedure Manual, SOP 7: 'Emergency Release of Uncrossmatched Blood'
AABB Standards for Blood Banks and Transfusion Services, current edition
New York State DOH CRR, Subpart 58-2, latest revision
Massive Transfusion Practices Around the Globe and a Suggestion for Common Massive Transfusion Protocol. Malone DL, Hess JR, Fingerhut A. J Trauma 2006; 60: S91-96.
Fresh Frozen Plasma Should be Given Earlier to Patients Requiring Massive Transfusion. Gonzalez EA, et al. J Trauma 2007; 62: 112-119.

Related Documents:

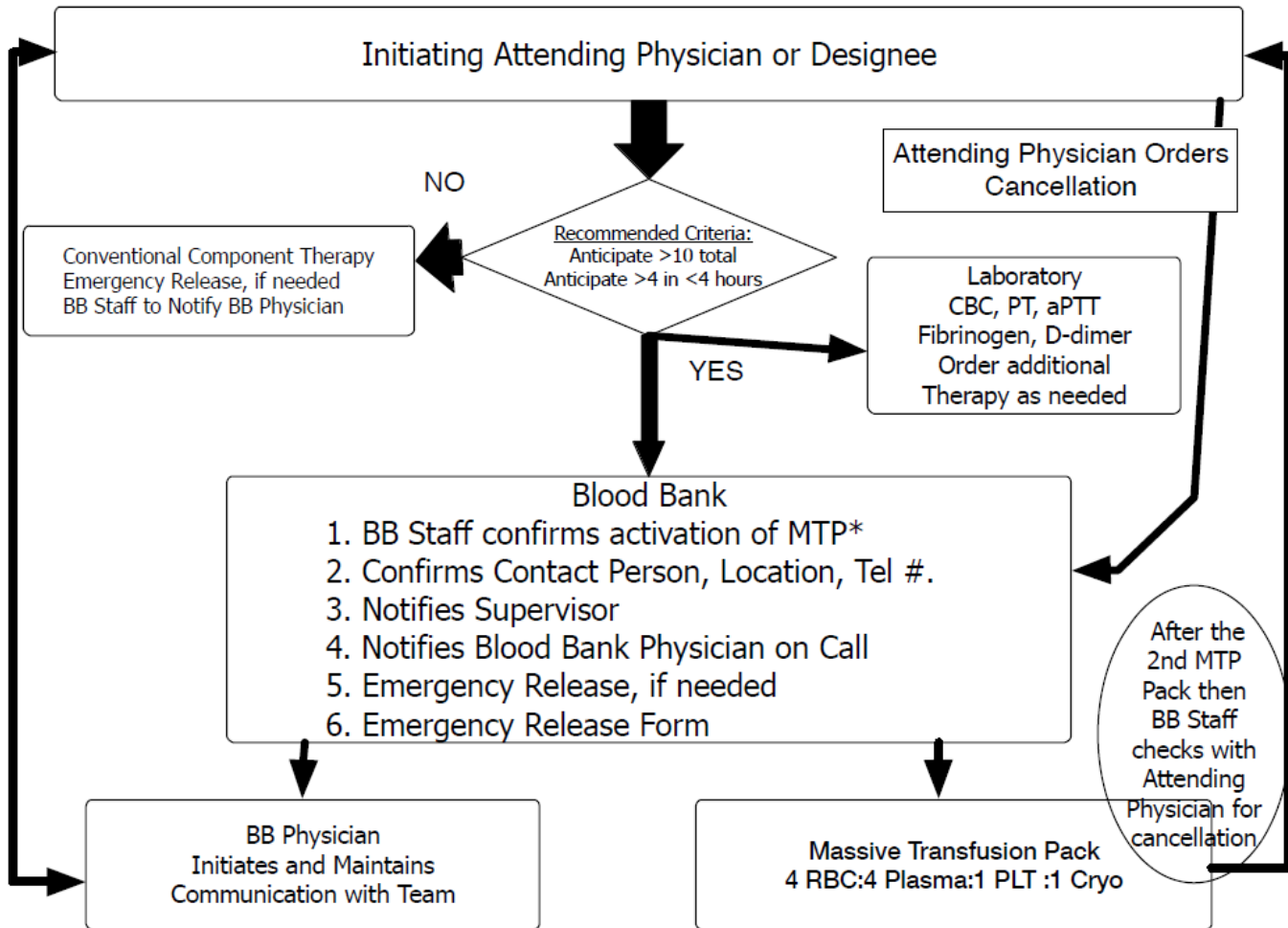
Blood Bank Policy Manual, SOP 7: Emergency Release of Uncrossmatched Blood
BB Form : BB 701 Emergency Blood Release / Massive Transfusion Protocol Form

Distribution List

Blood Bank technical and supervisory staff, Blood bank attendings, blood bank residents and fellows.

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Massive Transfusion Protocol FlowChart



NOTE: After two rounds of MTP, cryoprecipitate is not included in the pack.

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Revision/Version History

Version No.	Date	Additions/Amendments
<i>1.0</i>	<i>6/12/12</i>	<i>Original</i>
<i>2.0</i>	<i>1/31/2014</i>	<i>Combined Massive Transfusion and OB Hemorrhage procedures into one protocol.</i>

Archived Date: _____