CODE TRANSFUSION - Massive Hemorrhage Protocol– Informational Document

Purpose

This document provides information regarding the protocol involved to ensure the safe and expeditious provision of blood products during an identified situation of massive bleeding.[123]

Policy

- Massive hemorrhage protocol activation is appropriate only within the context of a massively bleeding patient within the Victoria Hospital site
    - **Massive bleeding** is defined as >150 mL per minute of ongoing blood loss with blood loss greater than half the blood volume or >4.5 L of blood loss in 30 minutes and ongoing uncontrolled bleeding.
    - **Massive hemorrhage protocol activation** requires ongoing **massive bleeding AND:**
        - Transfusion of 3 or more red blood cell (RBC) units in 1 hour **OR**
        - ABC Score 2 or more (SBP less than 90 mmHg, HR 120 bpm or more, or positive FAST by ultrasound) **OR**
        - Shock Index (HR/SBP) greater than 1.4.
    - The patient MRP (Lead Physician) shall clinically assess the patient to determine when massive bleeding criteria are met and decide when to activate the MHP.

MRP (Lead Physician) Responsibilities

- Obtain informed consent for blood transfusion. If informed consent cannot be obtained, ensure documentation of uncrossmated blood transfusion reason in the patient chart. Emergency consent must be completed by two Physicians when the patient is unable to provide consent.
- **Activate the MHP** following clinical assessment of the patient and determination that MHP activation criteria are **met.**
- Designate a 'Team Contact' to call switchboard to announce "CODE TRANSFUSION"
    - If possible the 'Team Contact' Role should be fulfilled by the Ward Charge Nurse (etc, expand list?)
- Contact the System Flow Coordination Center to discuss transfer, as appropriate (1-866-766-6050)
- Manage clinical care of the patient**.**
- Request customization of MHP box contents, as appropriate**.**
- **Deactivate the MHP** following clinical assessment and determination that hemostasis and resolution of coagulopathy have been achieved.
- Discuss the MHP activation and blood transfusions administered with the patient once clinical stabilization is established.

Nursing 'Team Contact' Role Responsibilities

- Notify the Fire and Disaster line by dialing 222. Request an overhead page of a "CODE TRANSFUSION"; including patient location.

- Notify Transfusion Medicine Lab at 5472 of MHP activation. The following details shall be provided by the team contact to the lab:
    - Team Contact name
    - Patient identification (name, HSN, sex)
    - Approximate patient age (or date of birth, if known)
    - Care team location

- Contact phone number
- Name of the MRP

- Utilize and complete the MHP Clinical 'Team Contact' Checklist.
    - Any change in patient location or team contact name should be provided to lab by phone at the time the change occurs to facilitate proper blood delivery.
    - Upon MHP discontinuation, the completed Checklist should be sent to lab by fax at 306-765-6163.
    - Team Contact to call Transfusion Medicine department at 5472 when MHP discontinued.
- 'Team Contact' Delegate a team member to call in extra staff after hours as needed.
    - Example: On call PACU nurse to be called in to assist OR team after hours. When available, the Nursing Supervisor will delegate staff from other areas as needed.
- 'Team Contact' shall delegate a team member to obtain the fluid warmer and obtain the MHP kit from OR, ER, Obstetrics or ICU, if not available in the patient location.
    - Note: Fluid warmers are located in the Operating Room and Emergency Room.

- Confirm with the TML technologist that a blood group and screen is available. If there is not a valid Group and Screen, the team contact will call the MLA for a STAT collection.
- Ensure bloodwork is collected as per the MHP algorithm (see also Step 12).

Blood Product Management Nurse Responsibilities

- Fluid warmers are located in the Operating Room, Emergency Room and Obstetrical Unit.
- One rapid infuser is available at all times. Location is at the entrance to the Operating Room on the other side of the automatic double doors.
- Responsible for checking and administering blood components
- Blood product management nurses are to stay with the patient if transferred to another department with in the Victoria Hospital. If receiving department has adequate staffing to manage MHP duties the blood product management nurses may return to their departments.
    - Ensure MHP Boxes are accounted for and returned to the lab promptly when empty, or within 60 minutes of blood issue to reduce risk of blood wastage.

Switchboard Responsibilities

- Upon receiving notification of MHP activation by the 'Team Contact', the switchboard operator shall:
    - Announce "CODE TRANSFUSION" overhead
    - Contact the on-call Lab Manager

Transfusion Medicine Laboratory Responsibilities

- The Transfusion Medicine Lab shall notify the following individuals upon hearing a "CODE TRANSFUSION" announcement::
    - Transfusion Medicine Physician on call.

- MHP activation occurring outside of regularly scheduled TML staffed hours at Victoria Hospital shall automatically trigger a call back of a TM technologist.
    - The lab manager shall be notified by switchboard of MHP activation and will be responsible for calling in additional staff.

- Ensure a lavender EDTA tube has been obtained for pre-transfusion testing as soon as possible to enable issue of group specific blood components.
  - Determine transfusion testing history to establish whether an ABO Confirm specimen is needed.

- Pack MHP boxes to include the following components, unless customized upon request:
  - **MHP Box 1** = 4 units RBC, 4 units plasma; if Obstetric MHP – include 4 g FC
    - If thawed plasma is unavailable, RBC units shall be issued in Box 1 in advance of plasma thaw completion. The TML technologist will notify the clinical team as soon as thawed plasma is available.
  - **MHP Box 2** = 4 units RBC, 2 units plasma, 4 g FC
    - Hold FC if Obstetric hemorrhage and already given in Box 1.

  - MHP box contents may be customized upon request, based on results of patient bloodwork.

General

- If uncrossmatched red blood cells are being requested, the requesting physician MRP shall document in the patient's chart that the clinical situation justifies the transfusion and obtain informed consent from the recipient when possible. Emergency consent must be completed by two Physicians when the patient is unable to provide consent.

- Group O RBC shall be issued until the patient's blood group is known and an ABO confirm group is resulted.
  - Females under 50 years of age shall receive Group O NEG, Kell NEG RBC
  - Males and females over 50 years of age shall receive Group O POS RBC
- Group specific blood components shall **only** be issued if a blood group has been determined during the <u>current hospital admission.</u>

- If the patient's blood group is unknown, **only** a maximum 8 units of AB plasma shall be issued.
  - If the patient's blood group has not been collected/tested after 8 units of AB plasma, the Transfusion Medicine Physician shall be notified for consideration of patient switch to Group A plasma.

- If platelets are requested, the TML will order from Saskatoon to be delivered urgently by cab. (Approximately 2 hour wait)

- Requests for plasma protein products outside of listed MHP box contents shall be reviewed with the Transfusion Medicine Physician. See treatment consideration section of MHP algorithm.

- Prior to blood component issue, a requisition containing patient identifiers (name, identification number), name of the requesting physician, time of request and blood destination **shall** be received by TML.
  - If patient identification is <u>unknown</u> at the time of MHP activation, the TML must be provided with patient identifiers (name, hospital number) assigned by patient registration, as per the requisition. Confirmed patient identification shall be merged with the assigned identification as soon as possible.

- Once the ABO blood group has been confirmed and/or IAT crossmatch results are available:
  - An attempt will be made by TML to retrieve all issued uncrossmatched RBC and replace with group specific uncrossmatched RBC.
  - An attempt will be made to retrieve RBC units issued which have been determined to be IAT crossmatch incompatible and replace with compatible units.

- All products issued under the MHP will be provided in red unsealed coolers that are not validated for product storage and therefore must either be:
  - Transfused within 4 hours of issue **OR**
  - Returned to Transfusion Medicine Lab within 60 minutes of issue for return to available inventory **OR**
  - Discarded by TML staff if returned unused greater than 60 minutes after issue.

- The MRP shall determine when the MHP may be discontinued.
  TM lab will be notified by Team Contact or MRP by phone upon discontinuation of MHP. The Team Contact Checklist will be received by fax.

  - The lab to announce overhead CODE TRANSFUSION all clear.
- Discussion of any problems arising from the MHP should be initiated within one week of the event if possible. A summary of any MHP activation event and blood product wastage report shall be reported to the Victoria Hospital Transfusion Medicine Committee for review.

Definitions

For the purposes of this document, the following definitions apply:

Term, abbreviation, acronym, etc.	Definition
bpm	beats per minute
FAST	Focused Assessment with Sonography in Trauma
FC	Fibrinogen Concentrate
g	gram
HR	heart rate
HSN	Health Services Number - A unique personal health number assigned to an individual. This is usually the Saskatchewan or out-of-province health number, or may be Canadian Forces (CF), Federal Penitentiary (FPS) number, etc. The HSN is entered into the 'PHN field' of the LIS. See Appendix B for HSN formats.
IAT	Indirect Antiglobulin Testing
may	Indicates the action is optional
MRP	Most Responsible Physician or Lead Physician
MHP	Massive Hemorrhage Protocol
RBC	Red blood cells
SBP	systolic blood pressure
shall	Indicates the action is mandatory
should	Indicated the action is recommended
TML	Transfusion Medicine Laboratory
TMP	Transfusion Medicine Physician

Procedure

Step	Action
1	MRP to identify the presence of 'massive bleeding'. See activation criteria
2	'Team Contact' to call to the Fire and Disaster line by dialing 222. Request an overhead page of a "CODE TRANSFUSION"; including patient location.

	• Call ext 5472 to notify TML
3	Using the MHP Clinical 'Team Contact' Checklist, the 'Team Contact' must provide TML with the following information: • Team Contact name • Patient identification (name, HSN, sex) • Approximate patient age • Care team location • Contact phone number • Lead Physician The 'Team Contact' should record this information on the checklist used during the MHP. At any time during the MHP TML must be updated on patient location or team contact name to ensure accurate delivery of blood components. **Note**: The Team Contact Checklist is located in the MHP kits located in ER, ICU, Obstetrics and OR.
4	Confirm with the TML technologist that a blood group and screen is available. If it has not yet been collected, the 'Team Contact' is responsible for ensuring the sample is drawn and received by TML.
5	If uncrossmatched red blood cells are being requested, MRP must document in the patient's chart the situation which justifies the transfusion. Obtain informed consent from the recipient when possible. Emergency consent must be completed by two Physicians when the patient is unable to provide consent. • Complete a Blood Product Request Form and send immediately to TML. • If patient identification is unknown at the time of the MHP, the patient will remain an unidentified patient (assigned name and identification number by registration) throughout the MHP event. Confirmed patient identification will be merged once the MHP is discontinued.
7	TML will notify the following individuals upon MHP activation: • Transfusion Medicine Physician on call #1-306-655-1000
8	TML will ensure that RBC's will be switched from Group O to group specific as soon as the patient ABO blood group is confirmed, and may be switched to Rh-positive according to the policy.
9	TML will prepare **MHP BOX 1** with 4 RBC, 4 plasma; if an Obstetric MHP 4 g FC will be included. TML will notify the ward when the box is ready. The ward is responsible for picking up the box. • Plasma takes about 25 minutes to thaw; the RBC +/- FC may be issued in advance of the plasma.
10	TML will begin to prepare **MHP BOX 2** with 4 RBC, **2** plasma, and 4 g (Note: FC will be held if already given in Box 1.) This box will be ready for issue within 30 minutes of MTP BOX 1. TML will notify the ward when the box is ready. The ward is responsible for picking up the box.
11	**MHP BOX 1 and 2** will alternate until the clinical situation is resolved
12	Order labs as follows: • Q 30min -CBC, INR, fibrinogen • Q1H - Venous blood gas or arterial blood gas, ionized Ca , K+ • Q4H - Urea, Creatinine, Electrolytes & Magnesium
13	Administer fluid through warming devices continuing to monitor patient temperature to maintain a core body temperature of greater than 36^{o}C. • Red blood cells or plasma may be infused through a blood warmer or rapid infuser (NOT platelets or plasma protein products).
14	Assess bleeding rate between doses of blood components. If possible, wait for results of laboratory tests before

<table>
<tr><td></td><td>transfusing additional blood components.</td></tr>
<tr><td>15</td><td>The contents of MTP boxes may be customized upon request on the basis of the last available laboratory tests:
<table>
<tr><th colspan="3">General Guidelines for lab Based Blood Component Replacement</th></tr>
<tr><th>PARAMETER</th><th>THRESHOLD</th><th>DOSE</th></tr>
<tr><td>Hemoglobin</td><td>Between 70-90g/L</td><td>Additional RBC (10cc/kg*); 1 RBC unit should raise hemoglobin 10g/L a in non-bleeding patient</td></tr>
<tr><td>INR</td><td>If INR greater than 1.8</td><td>Give 4 units of FP (10mL/kg*)</td></tr>
<tr><td>Platelets</td><td>If less than 50 x 10^9/L or projected to soon be less than 50 x 10^9/L.
<u>Note: If platelet count less than 1</u>50 x 10^9/L at MHP activation, consider pre-emptive order of 1 dose platelets from Saskatoon</td><td>Give 1 dose platelets (5-10mL/kg*)</td></tr>
<tr><td>Fibrinogen</td><td>Fib less than 1.5 g/L (non-Obstetrical patient) or 2g/L (Obstetrical patient) OR evidence of diffyse microvascular bleeding</td><td>Give 4 g FC (50 mg/kg*)</td></tr>
<tr><td>SBP</td><td>80-90mmHg unless increased intracranial pressure then mean arterial pressure greater than 80 mm/Hg</td><td>Treat hypovolemia Start epinephrine/ norepinephrine/vasopressin infusion</td></tr>
<tr><td>Ionized Ca</td><td>If less than 1.15 mmol/L.</td><td>Calcium gluconate 50mg/kg IV</td></tr>
</table>
*<u>Note: dose considerations in patients less than 50 kg.</u></td></tr>
<tr><td>16</td><td>Consider contacting the Transfusion Medicine Physician at any time to discuss the possibility of adjunctive blood component or plasma protein product therapy.</td></tr>
<tr><td>17</td><td>The ‘Team Contact’ is to inform TML when the MRP has discontinued the MHP, and communicate whether control of bleeding has been obtained, or when resuscitation efforts have been withdrawn. Return any unused blood products to TML as soon as possible.

Note: Products that are returned after more than 60 minutes may be held in the laboratory for a short period of time before being discarded taking into consideration all products must be infused within 4 hours of original issue from the laboratory.</td></tr>
<tr><td>18</td><td>Fax the completed MHP Clinical ‘Team Contact’ Checklist to TML 765-6163</td></tr>
</table>

Appendices

Appendix A – MHP Red Cell and Plasma Requirements

Appendix A – MHP Red Cell and Plasma Requirements

MHP Red Cell and Plasma Requirements ***Note:*** *The Transfusion Medicine Physician may recommend alternative blood components depending on inventory limitations and degree of blood component utilization.*							
Patient's Testing Status	**Red Cell Requirements**				**Plasma Requirements**		
	Crossmatched	Group Specific Uncrossmatched	Group O Rh Pos Uncrossmatched	Group O Rh Neg Uncrossmatched	Group Specific or Group Compatible	Group AB (8 units **only**)	Group A (TMP **must** be consulted prior to switching to Group A)
Unknown patient identification – no blood group this admission Male < 17 years, Female < 50				Yes*		Yes	Yes
Unknown patient identification – no blood group this admission Male ≥17 years, Female ≥ 50			Yes			Yes	Yes
Identified patient – no blood group this admission Male < 17 years, Female < 50				Yes*		Yes	Yes
Identified patient – no blood group this admission Male ≥ 17 years, Female ≥50			Yes			Yes	Yes
Identified patient, blood Group done on this admission, but Screen outdated or not tested		Yes*			Yes		
Identified patient, blood group and screen done on this admission, but no historical blood group All males, female ≥50			Yes		Yes		
Identified patient, blood group and screen done on this admission but no historical blood group Female <50				Yes* ()	Yes*		
Identified patient, in-date Group and Screen completed, ABO Group confirmed	Yes*				Yes		

*If inventory allows, all female patients of childbearing potential (<50 years of age) should receive Kell negative RBC

References

[1] Calgary Laboratory Services. FMC Massive Transfusion Protocol (MTP) – Adult. https://www.calgarylabservices.com. Accessed September 6, 2016.

[2] Hunt BJ, Allard S, Keeling D, et al. A Practical Guideline for the Haematological Management of Major Haemorrhage. In: British Journal of Haematology. 2015. 170, 788-803.

[3] Dzik WH, Blajchman MA, Fergusson D, et al. Clinical review: Canadian National Advisory Committee on Blood and Blood Products – Massive Transfusion Consensus Conference 2011: report of the panel. Critical Care 2011, 15:242.