

**UAMS MEDICAL CENTER
TRAUMA SERVICES MANUAL**

SUBJECT: Massive Transfusion Protocol

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PURPOSE:

To describe the UAMS Acute Care Surgery Massive Transfusion Protocol (MTP).

DEFINITIONS:

ABC Score (Assessment of Blood Consumption) (1pt each):

- Penetrating mechanism to the torso or junction areas (neck, axilla, groin)
- Systolic BP \leq 90 in ED
- HR \geq 120 in ED
- +FAST (abdomen, pelvis, cardiac)

Balanced Resuscitation: A ratio of blood products between 1:1:1 and 2:1:1 (RBC:plasma:platelets)

Clinical gestalt: a heuristic approach to quickly forming a diagnosis and treatment plan, often within seconds of data collection, via pattern recognition and organization of clinical observations and perception of those observations.

Designated contact: a nurse designated by the activator of the MTP will facilitate communication between the clinical area and the Blood Bank (this person may change over time).

Low-titer whole blood (LTOWB): UAMS will maintain Rh(+) Whole Blood (WB) and define low titer as $< 1:256$.

Massive Transfusion: (6:6:1 RBC:plasma:platelets OR 6 U WB in the first 4 hours)

Massive Transfusion Protocol: The MTP is designed to provide quick and efficient resuscitation to an exsanguinating patient by continuing to deliver blood to the bleeding patient until massive bleeding has stopped.

Women at risk for future Rh incompatibility: Women \leq 50 years old who are Rh(-) on presentation and receive LTOWB Rh(+) blood products

POLICY:

I. Activation of the MTP

a. Decision: The **Massive Transfusion Protocol** can be activated by:

- i. Attending Physician
- ii. Senior Surgery Resident if an Attending Physician is unavailable

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- b. Criteria for a Balance Blood Product MTP:
 - i. **ABC Score** ≥ 2 (arrival vital signs – not based on pre-hospital vitals)
 - ii. Physician **gestalt** that the patient will require a **Massive Transfusion**.
- c. The Trauma Attending may activate a **Whole Blood MTP** based on:
 - i) **ABC Score** ≥ 3 (arrival vital signs – not based on pre-hospital vitals)
 - ii) Trauma attending **gestalt** with a patient being taken immediately to the OR for non-compressible torso or junctional trauma.
- d. Notification:
 - 1) Upon activating a **massive transfusion protocol**, the Attending Physician (or senior surgery resident) will assign a nurse as the **designated contact** to call the **Blood Bank Hotline at 686-7007** to inform them that a MTP is being activated.
 - i. The following information will be provided to the Blood Bank:
 - i. Destination where the blood products should be delivered (ER, OR, ICU)
 - ii. Tube station to send the blood
 - iii. Name of the patient
 - 1. If a Balance Blood Product MTP is being activated and the patient's name is "unknown," the following designations will be used until the name of the patient appears in the electronic medical record:
 - a. "Male Doe" (if the patient is male or female > 50 y/o)
 - b. "Female Doe" (if the patient is female & ≤ 50 y/o)
 - 2. If a Whole Blood MTP is being activated the Blood Bank will be told the name of the patient and that a “**Whole Blood Activation**” is being activated.
- e. Blood Bank Activation of Hemorrhage Team
 - i. The Blood Bank will activate the Hemorrhage Team when an MTP is activated using the RAVE system. The MTP location will be entered.

II. MTP Conduct & Considerations

- 1. Send a Type and Screen (T&S) and ROTEM immediately before administering any blood products (if circumstances allow). If circumstances require blood to be transfused immediately, the T&S specimen should be obtained as soon as possible.
- 2. Ensure adequate and functioning IV access (preferably 2 x 18 gauge or larger (e.g., RIC, Cordis CVL)).
 - a. Placement in an upper extremities/internal jugular (IJ)/subclavian is preferred (especially if there is a concern for a thoracoabdominal injury).
 - b. An arterial line should also be placed as soon as possible for more accurate and timely

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blood pressure monitoring.

3. Infuse whole blood or **Balanced Resuscitation** to maintain systolic blood pressure ~75-85 mmHg.
 - a. If concern for severe traumatic brain injury (TBI):
 1. MAP \geq 60 mmHg is suggested.
 2. Avoid albumin and hyponatremic fluids (e.g., lactated ringers, $\frac{1}{2}$ NS).
 - b. Each 1:1:1 MTP megapack is 6 units RBCs, 6 units Plasma, and 1 apheresis Platelet (equivalent to a pool of 6 units of whole blood derived platelets).
4. When available, platelets should be administered first through a separate i.v. (not through a rapid infuser such as Belmont® Rapid Infuse, 3M Ranger®). RBCs and plasma may be given at the same time, through the same IV. Whole blood can be given through a rapid infuser.
5. Type-compatible blood should be administered as soon as it is available.
6. Keep the patient warm ($>36^{\circ}$ C) by removing wet clothing, covering them with warm blankets, using a fluid warmer (Belmont® Rapid Infuse, 3M Ranger®) or Bair Hugger®, maintaining a warm room, or using other techniques to prevent hypothermia.
7. Administer calcium gluconate, 3 grams (or calcium chloride 1 gram through CVL), with each MTP megapack (6:6:1 balanced resuscitation or 4 units WB).
8. Consider beginning a vasopressin infusion to reduce the volume of required blood transfusions. The vasopressin infusion consists of:
 - a. Initial: 4 IU bolus
 - b. Followed by: AVP infusion titrated from 0 to 0.04 U/min for 48 hours to maintain a MAP ~ 65mmHg
9. ROTEM:
 - a. On arrival: should be checked approximately 30-60 min after arrival to look for hyperfibrinolysis (EXTEM ML $>15\%$). If the patient is in hyperfibrinolysis, 2g of TXA should be administered over 10 min.
 - b. When bleeding has slowed: should be checked to look for component deficiencies, especially for Cryoprecipitate, which are not included in the MTP.
10. When a Whole Blood MTP is administered:
 - a. A maximum of 8 units (4 from ED Blood Safe + 4 from Blood Bank via tube system) of **LTOWB** can be transfused per patient. Because of limited supply, this resource should be limited to patients who are believed to be actively exsanguinating.
 - b. After 8 units for a patient or no remaining product in hospital, the MTP will automatically transition to balanced blood product resuscitation approximating WB (1:1:1 of RBC:plasma:platelets+/-cryo).
 - c. WB Transfusion Monitoring: Patients who receive whole blood will be identified in the UAMS trauma registry to allow for outcomes measuring.
 - d. When Rh(+) **LTOWB** is transfused to women at risk for future Rh incompatibility:
When Rh(-) women who are < 50 years old are given Rh+ **LTOWB**, the patient will

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be notified and given a card to provide to their obstetrician in the event of future pregnancies. This is to notify the patient of potential risk to fetuses through Rh incompatibility.

III. MTP Administration:

1. MTP activation will result in Blood Bank personnel sending one (1) megapack (6:6:1 of RBC:Plasma:Platelets) to be transfused. Call the blood bank for each additional megapack.
2. Upon activation of this protocol, the Blood Bank personnel will notify the appropriate pathology personnel if problems are identified during the **massive transfusion protocol**.
3. Blood products will be delivered by a pneumatic tube system using the secure transaction procedure to the location and tube station specified at the time of activation of the MTP. Any change in location of the patient will require a verbal update by the **designated contact** person to the Blood Bank of the new patient location.
4. A **Massive Transfusion Protocol** Worksheet may be used to document the administration of blood and blood products during the MTP. Stickers from each unit should be applied to the worksheet to keep track of the status of products administered to the patient.
5. The protocol should be discontinued as soon as clinically appropriate, and the Blood Bank should be notified of the termination of the **massive transfusion** by calling 686-7007.

IV. Blood Buggy

A secondary goal of the MTP is to minimize the wastage of blood products. The following procedures are designed to assist in meeting this goal.

1. The Blood Buggy is a portable refrigeration unit certified to hold blood products for a maximum of 12 hours while maintaining appropriate storage conditions including temperature. UAMS has two Blood Buggies kept in the OR and one each in the ED, H4, and E5.
2. The Blood Buggy shall be kept plugged into a red outlet at all times when not being used for an MTP.
3. For patients in the operating room undergoing MTP transfusion, an additional circulator will be provided, as available, to help manage the MTP. This nurse's primary responsibility will be to act as the **designated contact** person with the Blood Bank and facilitate the receipt of blood products.
4. Upon activation of an MTP in the OR or Interventional Radiology (IR), the first mega pack will be delivered to the tube station in the OR and transferred to the Blood Buggy. RBC and plasma will be placed inside the refrigerated unit; platelets will be placed in the platelet tray. Because cryoprecipitate will only be sent by the Blood Bank when ordered, it should be administered as soon as it arrives.
5. The Blood Buggy will be moved with the patient to the OR or IR and placed in its designated location. After that, all blood products will be transferred directly from the tube station to the Blood Buggy, typically by the **designated contact** person.

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6. If the patient moves from the OR to the ICU or IR before completing the MTP, the Blood Buggy will travel to the new patient location..
 - a. If the patient goes to IR, the circulating nurse will transition the role of the **designated contact** person to an assigned individual who will run back and forth between the OR tube station and IR.
 - b. If the patient goes to ICU, the circulating nurse will transition the role of the **designated contact** person to the ICU nurse and take the H4 Blood Buggy back to the OR.
7. After the MTP has concluded, the **designated contact** person will notify the Blood Bank of the termination of the MTP. The **designated contact** person will ensure that all non-transfused blood products are appropriately stored in the Blood Buggy. Platelets will be placed in the platelet tray.
8. The Blood Buggy and the **Massive Transfusion Protocol** Tracking Form will be taken to the Blood Bank as soon as possible, even if the Blood Buggy is empty. The emptied Blood Buggy will undergo quality assurance before it is returned to the OR, ED, H4, or E5 as appropriate and plugged in for future use.

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