

## **Pediatric Trauma Massive Transfusion Guideline**

**Purpose:** To provide Trauma Surgeons with guidance regarding safe, efficient and effective procurement and delivery of blood products is provided for hemodynamically unstable patients needing rapid transfusion (rapid restoration of intravascular blood volume while maintaining oxygen carrying capacity and coagulability of the blood).

**Scope:** Pediatric Trauma patients requiring a transfusion approximating or exceeding the patient's blood volume within a 24 hour interval or the acute administration of more than half the patient's estimated blood volume per hour. Estimated blood volume for a child is 80ml/kg.

### **Protocol:**

#### **A. Physician Responsibilities:**

1. Initiate and then manage the Pediatric Massive Transfusion Protocol (PMTP).
  - a. Activation of the PMTP will be at the discretion of the responsible physician. Once a threshold of >40ml/kg of PRBC's has been ordered in rapid succession, activation of the PMTP should be strongly considered.
  - b. Pediatric patients weighing 50kg and greater will use the Adult Massive Transfusion Protocol.
2. Complete the PMTP order set, ensuring that all prerequisite orders have been completed.
3. Give orders to correct medically significant hypothermia, hypocalcemia; or electrolyte, osmolar, blood gas and acid-base disturbances.
4. Order the cessation of the PMTP when the patient's condition stabilizes or end point resuscitation goals are met.

#### **B. Nursing Responsibilities:**

1. Activate Transfusion Team when indicated.
2. Notify the Blood Bank of the initiation of the PMTP. This is the responsibility of the charge nurse, patient's primary nurse, or designee, under the direction of the physician managing the PMTP.
3. Properly identify the patient per hospital policy.
4. Ensure adequate IV access site(s) are patent and secure.
5. Draw blood specimens for analysis as outlined in PMTP protocol.
6. Initiate the PMTP worksheet. Follow orders as per the PMTP order set.

7. Arrange for transport of massive transfusion packs from the Blood Bank to the patient location.
8. Document patient information on blood administration record.
9. Administer blood products, using pressure bags or rapid transfusion as indicated. Level I infusers are available in ED, OR, and STICU.  
**NOTE: Do not transfuse platelets or cryoprecipitate through Level I or warming device. May utilize pressure bag.**
10. Monitor patient temperature, vital signs, respiratory status, cardiac rhythm and response to transfusion.
10. Monitor for complications: Hypothermia, hyperkalemia, hypocalcemia, altered oxygen carrying capacity, transfusion reaction.
11. Maintain normothermia (35°C - 37°C) by administering fluids warmed to 40°C; utilizing Bair Hugger or Gaymar Wraps as needed; increasing ambient room temperature; utilizing ventilator humidifier as necessary.
12. Notify Blood Bank when cessation of PMTP has been ordered by physician managing the protocol.

#### C. Blood Bank Responsibilities:

1. Prepare blood products as per the PMTP Blood Product Shipment & Lab Value Schedule located in PMTP protocol.
2. Provide type specific or crossmatched blood whenever possible. Patients can be transfused with un-crossmatched blood if the physician determines the risks involved with transfusing un-crossmatched blood to be less detrimental to the patient than the risks of delaying transfusion.
3. Notify nursing unit if any issues arise regarding the procurement or delivery of blood products.

#### D. Laboratory Responsibilities:

1. Have personnel available to draw blood specimens and perform lab tests as outlined on the PMTP Blood Product Shipment & Lab Value Schedule.

#### E. Handling of Blood Products

1. Red blood cell products and plasma must remain in the blood product cooler until administered.
2. Platelets and Cryoprecipitate must remain at room temperature and are NEVER placed in the cooler.
3. Unused blood products are to be transported with the patient to any new location if still needed.

#### E. Termination of PMTP:

1. The physician responsible for managing the PMTP will order cessation of the PMTP when the patient's condition stabilizes or end point resuscitation goals are met:

NOTE: Numerical transfusion-related resuscitation goals are general goals. Numerical goals should not take precedence over clinical and physiological assessment of the patient.

- a. Prothrombin Time less than 18 seconds; PTT less than 42 seconds
- b. Fibrinogen greater than 200 mg per dl
- c. Platelets greater than 50,000
- d. Hematocrit greater than 24%
- e. Base deficit less than 5.0
- f. Core temp greater than 35.5° Celsius

2. The patient's nurse or designee will notify the Blood Bank when cessation of the PMTP has been ordered.

#### F. Re-initiation of PMTP:

1. If the PMTP has been discontinued prior to Shipment 4, the protocol may be reinitiated from the point at which it was discontinued.

#### References:

- A. American Association of Blood Banks. Standards for Blood and Transfusion Services.
- B. Cincinnati Children's Hospital Medical Center, Massive Blood Transfusion Protocol. 2011
- C. Gonzalez, E., Moore, F., Holcomb, J., Miller, C., Kozar, R., Todd, R., Cocanour, C., & McKinley, (2007). Fresh frozen plasma should be given earlier to patients requiring massive transfusion. *The Journal of TRAUMA*, 62(2007), 112-119. doi:10.1097/ta.0000250478101.8
- D. Snyder, C., Weinberg, J., McGwin, G., Melton, S., George, R., Reiff, D., Cross, J., & Hubbard-Brown, J. (2009). The relationship of blood product ratio to mortality: survival benefit or survival bias. *Journal of TRAUMA*, 66(2009), 358-364. doi:10.1097/TA.0b013e318196c3ac.
- E. Sperry, J., Ochoa, J., Gunn, S., Alarcon, L., Minei, J., Cuschieri, J., Rosengart, M., & Maier, R. (2008). An ffp: prbc transfusion ratio 1:1.5 is associated with a lower risk of mortality after massive transfusion. *The Journal of TRAUMA*, 65(2008), 986-993. doi:10.1097/TA.0b13e3181878028

## REVIEW/REVISION HISTORY

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