PURPOSE:

Transfuse patients with PRBC (Packed Red Blood Cells) who are symptomatic from relative anemia.

- Patients with suspected blood loss, who are in shock (hypotension with signs of poor perfusion) which is not correctable with IV fluid (2 liters NS (30 ml/kg for an adult or 20 cc/kg for a child), should be transfused RBC until the shock state has abated.
- **Adult Trauma Patients**: **transfuse O negative blood concurrent with 2 L NS wide open if obvious hemorrhagic shock**, defined as traumatic mechanism of injury with hypotension (2 separate SBPs <90 mm HG and HR > 140) not easily explained by other causes of shock. Continue with transfusion of O negative PRBCs until hemorrhage controlled/hypotension & shock state resolved. Contact med control to consider Massive Transfusion Protocol (MTP).
- **Pediatric Trauma Patients**: **transfuse O negative blood concurrent with 20ml/kg NS wide open if obvious hemorrhagic shock**, defined as traumatic mechanism of injury with hypotension as defined by Broslow Tape for appropriate size (2 separate SBP's and HR within ranges of shock criteria) not easily explained by other causes of shock. Continue with transfusion of O negative PRBCs until hemorrhage controlled/hypotension & shock state resolved. Contact med control to consider MTP if transport is prolonged and if transfusion of more than 2 units of PRBCs is anticipated and platelets/FFP are available.
- Patients with Hemoglobin (Hgb) less than 7 g/dL or Hemocrit less than 21%
- Patients with acute coronary syndrome with Hemoglobin (Hgb) less than 8 g/dL or Hemocrit less than 24%
- Rapid blood loss (greater then 1500-2000mL) not responding to appropriate volume resuscitation or with ongoing blood loss
- Normovolemic patient with need for increased oxygen carrying capacity evidenced by tachycardia, hypotension, or unresponsive to volume resuscitation
- Each unit of blood (or 10cc/kg of blood for peds) raises the Hgb by 1g/dl and the Hct by 3%

After discussion with referring physician and/or medical control, other blood products may be administered.

- Platelets
    - Indications
        - Platelet count <10,000 K/cm in a non-bleeding patient with failure of platelet production.
        - Platelet count <20,000 K/cm with signs of hemorrhagic diathesis (petechiae, mucosal bleeding).
        - Platelet count <50,000 K/cm with active hemorrhage or recent procedure (recent, inprocedure, planned).
        - Platelet count <100,000 K/cm with active hemorrhage cardiac/neurosurgery procedure (recent, in-procedure, planned).
        - Documented platelet dysfunction.
    - Dosing
        - One pheresis unit in adults or 5-10ml/kg in pediatrics = an increase in platelet count by 25K-35K/μL.
        - Non-hemorrhaging adults transfuse at 2-3mL/min X 15 min. then 5mL/min (300mL/hr); titrate rate to patient's physiologic state
- FRESH FROZEN PLASMA (FFP):
    - Indications
        - INR ≥2.0 and invasive procedure (recent, in-progress, planned).
        - INR >1.7 and neurosurgical procedure (recent, in-progress, planned).
    - Dose Recommendations:
        - 10-15 mL/kg is usually adequate to correct a coagulopathy (1 unit FFP = 250-330

mL).
    - Non-hemorrhaging adults 2-3 mL/min X 15 min. then 5 mL/min (300 mL/hr); titrate rate according to patient's physiologic status.
- CRYOPRECIPITATE:
    - Indications
        - Fibrinogen <100 mg/dL.
        - Fibrinogen <150 mg/dL with active hemorrhage.
    - Dose Recommendations:
        - Non-hemorrhaging adults transfuse at 1 mL/min (60 mL/hr).
- Factor Concentrate – Used to replace individual factor deficiencies.
    - **See REVERSAL OF ANTICOAGULANTS Protocol for additional information**

STAKEHOLDERS:

All Aspirus MedEvac Transport Teams

PROVISIONS (POLICY / CONTENT / PROCEDURAL STEPS):

Scope: Paramedic/Critical Care Paramedic/Nurse

I. If not an emergency transfusion, obtain or confirm informed consent for blood transfusion.
II. A 20ga. IV catheter or larger or a 15ga. IO needle or larger is needed to avoid hemolysis. Use blood administration tubing with a screen filter. Use NS to dilute blood products and speed administration. Never administer a drug with the blood products.
III. Check the appearance of the unit for presence of clots, clumps or abnormal cloudiness, and integrity of seals. If appearance is suspicious, return it to Blood Bank, as it may not be appropriate for infusion.
IV. The following is the preferential order of how blood should be given if available:
    A. Type and Cross matched
    B. Type Specific
    C. Type compatible
    D. O negative blood (universal donor type)
V. Two qualified medical crew or other qualified health professionals trained in blood administration procedures (includes EMT/AEMT) need to compare :
    A. Blood type and Rh type recorded with the container bag and container label ensuring that they are either identical or compatible.
    B. The blood product number on the blood container with the product number on the blood container tag.
    C. Compare the expiration date and time on the blood container label to the current date and time.
VI. If typed blood available, two qualified medical crew or other qualified health professionals trained in blood administration procedures (includes EMT/AEMT) need to compare:
    A. Verify the patient's name and medical record number on the blood unit with the information on the recipient's identification bracelet and the information recorded in the patient record.
    B. Verify the information on the patient wristband and blood unit.
    C. If the patient is able, ask them to state their name and DOB.
VII. Document the beginning and ending time for each unit of blood and its blood unit number on the transport medical record. Monitor and record the patient's temperature, pulse and blood pressure, and end-tidal carbon dioxide ($EtCO_2$). If no thermometer is available for quantitative measurement, feel central skin temperature for qualitative measurement and document relative value. Have the same medical crew member perform each temperature assessment to improve

reliability.

A. Before starting transfusion, record blood pressure, pulse and temperature.
B. Check pulse and temperature 15 minutes after starting each pack.
C. Observe the patient throughout the transfusion.
D. Repeat blood pressure, pulse and temperature when the transfusion is completed.
E. If the patient is conscious, further temperature recordings are only needed if the patient becomes unwell or has symptoms or signs of a reaction.
F. An unconscious patient should have pulse and temperature checked every 15 minutes during the transfusion.

VIII. It is very important to pay attention to any adverse reaction symptoms or signs - often occurring during the first 15 minutes of the infusion - such as distress, pain at or near the transfusion site, pain in abdomen, flank or chest, fever, flushing, hypotension, or urticaria.

IX. If a transfusion reaction is suspected, stop the transfusion and assess and record temperature, pulse and blood pressure. Record the volume and color of any urine passed.

A. **If the only feature is a rise in temperature of < 1.5°C from baseline or an urticarial rash:**Recheck that the right blood is being transfused
   a. **Adult Patients**: give **Acetaminophen (Tylenol)** 1**5mg/kg up to 1000mg PO** every 4 hrs as needed **OR Ibuprofen (Motrin) 10mg/kg po** not to exceed 600mg po **OR Ketorolac 15-30mg IV**.
   b. **Pediatric Patients**: give **Acetaminophen (Tylenol)** give up to but *not exceed* **15mg/kg up to 1gm PO/PR** every 4 hrs as needed. Use highest dose equivalent available **OR Ibuprofen (Motrin) 10mg/kg po** not to exceed 600mg po. .
   c. Give antihistamine for urticaria (see **Protocol** – **Adult Allergic Reaction / Anaphylaxis**)
   d. Recommence the transfusion at a slower rate
   e. Observe more frequently than routine practice.

B. **If a severe acute reaction is suspected:**
   a. stop the transfusion - keep the IV/IO line open with saline
   b. check and record patient's temperature, BP, pulse, respiratory rate
   c. check for respiratory signs - dyspnea, tachypnea, wheeze, cyanosis
   d. recheck the identity of patient and blood unit and documentation
   e. notify blood bank
   f. check O2 saturation
   g. provide further management according to the patient's developing clinical features**.**
   h. **Methylprednisolone [PARA]: Adult: 125mg IV; Pediatric: 1mg/kg IV**

X. Administration Notes/Additional Considerations:

A. **Calcium Gluconate 1-3g after 6 units PRBC as part of a massive transfusion protocol**
B. All blood components must be administered through a filtered administration set. Blood components include platelets, fresh frozen plasma, packed red cells, and cryoprecipitate.
C. Utilize a new administration set every (4) hours.
D. Administration sets may be used for up to (2) units of packed red cells or (2) units of platelets.
E. Administration sets may be used for more than (2) units of fresh frozen plasma and cryoprecipitate as long as transfusion is complete within (4) hours.
F. TUBING MUST NOT BE USED LONGER THAN FOUR (4) HOURS. Rationale: Sepsis and blood tubing filter may clog. If using Y-type tubing set, may aseptically remove partially used saline bag from existing tubing and attach to new administration set.
G. Blood product infusion should be initiated within (30) minutes of receiving from the Lab. If the transfusion cannot be initiated within (20) minutes, the blood should be returned to the lab.
H. Massive Transfusion Protocol: The massive transfusion protocol (MTP) is designed for the rapid restoration of blood volume and oxygen-carrying capacity as well as for the prevention of coagulopathy and other complications related to hypovolemic shock.
   a. Indications: patients whose anticipated blood replacement is greater than 4 units RBC transfused in the first hour OR expected transfusion requirements in excess of 10 units in a12-hour period.

b. Infusion of a ratio of products (1:1:1) 6 RBC, 6 fresh frozen plasma (FFP), and 1 pack of apheresis platelets (equivalent to a "6 pack of platelets" or 6 donor platelet units).

REFERENCES:

Blood Administration - Blood Transfusion (Blood and Blood Components) Policy/Procedure (System)