

MANUAL:		POLICY #:	
SUBJECT:	Guidelines for the transfusion of packed red blood cells, fresh frozen plasma, platelets, and cryoprecipitate in critically ill patients	EFFECTIVE DATE:	
		REVISED DATE:	
PERSONNEL COVERED:	Nursing, respiratory and physician care providers of relevant patients in intensive care unit environments	AUTHORIZED APPROVAL:	
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PURPOSE

The purpose of this policy is to develop a clinical practice guideline for the transfusion of packed red blood cells, fresh frozen plasma, platelets, and cryoprecipitate in adult patients in (surgical) intensive care unit environments. Blood products are a scarce resource and their transfusion may result in complications, suggesting that an evidence-based approach for practice, tailored to clinical situations, is most appropriate.

DEFINITION

- *Packed red blood cells* are used to treat hemorrhage and anemia as well as to improve oxygen delivery to tissues.
- *Fresh frozen plasma* is a blood component from whole blood or collected by apheresis, frozen within time limits and at a temperature such as to preserve the labile clotting factors adequately. It is dosed at 10-15mL/kg of body weight, depending on clinical situation in an ABO- (not necessarily Rh-) compatible fashion.
- *Platelets* are a blood component from whole blood or collected by apheresis transfused in an ABO- and Rh-compatible fashion in those with thrombocytopenia (<100,000), relative thrombocytopenia depending on circumstance (<10-100,000) or thrombocytopathia.
- *Cryoprecipitate* is a blood component containing fibrinogen and other coagulation factors (e.g. Factor 8, 13 and von Willebrand's factor).

POLICY

Transfusions of packed red blood cells, fresh frozen plasma, platelets and/or cryoprecipitate will be ordered by ICU care providers in consultation with the primary team and relevant consultants.

PROCEDURE

1. Prior to administering any blood products, the bedside nurse will verify that consent has been obtained from the patient or surrogate.
2. Blood products will be administered as per hospital policy, with attention to possible transfusion reactions. In the event of a transfusion reaction or possible transfusion reaction, the transfusion will be discontinued and hospital policy will be followed.
3. *Packed red blood cell* transfusion may be indicated in the following circumstances:
 - In patients with:

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- o evidence of hemorrhagic shock
- o evidence of acute hemorrhage and hemodynamic instability or inadequate oxygen delivery
- o symptomatic anemia in a normovolemic patient
- o preoperative hemoglobin level < 8 g/dL and an operative procedure associated with major blood loss

The use of a hemoglobin level as a trigger for transfusion should be avoided. Decisions for RBC transfusion should be based on an individual patient's intravascular volume status, evidence of shock, duration and extent of anemia and cardiopulmonary physiologic parameters. In the absence of acute hemorrhage, RBC transfusion should be given as single units with reassessment after therapy.

All efforts should be initiated to avoid RBC transfusion in patients at risk for ARDS and acute lung injury after completion of resuscitation.

There is insufficient evidence that a liberal transfusion strategy (PRBC transfusion when hemoglobin is <10g/dL) is beneficial in critically ill patients with hemodynamically stable anemia, except *possibly* in patients with acute myocardial ischemia. *Consider* RBC transfusion if hemoglobin <7g/dL in critically ill patients in the following circumstances:

- those requiring mechanical ventilation
- resuscitated septic or trauma patients, including those with traumatic brain injury. The optimal transfusion trigger for those with subarachnoid hemorrhage is not known.
- those with stable cardiac disease. (Those with acute coronary syndromes *may* benefit from transfusion if hemoglobin is < 8g/dL).

4. *Fresh frozen plasma* transfusion may be indicated in the following circumstances:

- In patients with congenital or acquired deficiencies of clotting when the pT or aPTT ratio is >1.5 with:
 - o generalized microvascular, non-surgical bleeding with correction of the underlying cause or in those who have been transfused > 1 blood volume
 - o factor deficiencies if the specific factor is unavailable in the presence of active bleeding or to prevent bleeding during an invasive procedure. Invasive procedures may include the performance of endoscopy with biopsy, liver biopsy, lumbar puncture, epidural anesthesia, insertion of an intracranial pressure monitor, or large diameter central venous catheter or chest tube. Invasive procedures performed in areas that are readily compressible, particularly under imaging guidance (i.e. ultrasound) of insertion or removal of smaller diameter catheters may not require a transfusion.
 - o during treatment with vitamin K antagonists (warfarin) if Prothrombin Concentrate Complex (PCC) is unavailable in the presence of major or intracranial hemorrhage or in preparation for surgery or an invasive procedure (see above) that cannot be delayed
 - o liver disease with active bleeding or prevention of bleeding in the case of surgery or invasive procedures (as above)

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5. *Platelet* transfusion may be indicated in the following circumstances:

- Active bleeding in patients with:
 - o generalized, microvascular active, major or dangerous bleeding or in those who have been transfused > 1 blood volume or with documented DIC (threshold platelets/microL = 50,000). A threshold value of up to 100,000 platelets/microL may be appropriate in those with more minor or less active bleeding.
 - o acute liver failure (no threshold level set)
 - o bleeding and a qualitative platelet defect (congenital or acquired) (no threshold level set)
 - o autoimmune thrombocytopenia with major and/or dangerous bleeding (e.g. severe intestinal, ocular or intracranial hemorrhage) (no threshold level set)
- Prophylaxis:
 - o for ocular surgery or neurosurgery (threshold platelets/microL = 100,000)
 - o for major surgery with risk factors (including the risk of bleeding, the type and extent of the operation, the ability to control intraoperative bleeding, the consequences of uncontrolled bleeding, the presence of other factors that can affect platelet function such as renal failure and other comorbid conditions) (threshold platelets/microL = 50-100,000)
 - o for major surgery without risk factors (threshold platelets/microL = 50,000)
 - o for invasive procedures (threshold platelets/microL = 50,000). Invasive procedures may include the performance of a endoscopy with biopsy, liver biopsy, lumbar puncture, epidural anesthesia, insertion of an intracranial pressure monitor, or large diameter central venous catheter or chest tube. Invasive procedures performed in areas that are readily compressible, particularly under imaging guidance (i.e. ultrasound) of insertion or removal of smaller diameter catheters may not require a transfusion.
 - o platelet count <10-20,000 in a non-bleeding patient with a failure of platelet production

6. *Cryoprecipitate* transfusion may be indicated in the following circumstances:

- In patients with:
 - o generalized microvascular, non-surgical bleeding with fibrinogen <100 mg/dL
 - o factor deficiencies if the specific factor is unavailable

PERFORMANCE REVIEW

The ICU director along with the multidisciplinary team will meet on a regular basis to identify and address issues through quality assurance and continuous quality improvement activities. The SICU database will track relevant patient data. This information will be reviewed and discussed regularly to identify opportunities for improvement.

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DISCLAIMER

These clinical guidelines may not be appropriate for all patients under all circumstances. New information and evidence may become available that renders their content less valid. Practitioners must utilize their clinical judgment to determine what is helpful to them and what is appropriate.

REFERENCE(S)

- Napolitano LM, Kurek S, Luchette FA, Corwin HA, et al. Clinical practice guideline: Red blood cell transfusion in adult trauma and critical care. Crit Care Medicine, 2009; 37: 3124-3157.
- Liumbruno G, Bennardello F, Lattanzio A, Piccoli P, et al. Recommendations for the transfusion of plasma and platelets. Blood Transfusion, 2009; 7: 132-150.
- American Association for the Study of Liver Disease. 2012 Guidelines—Acute Liver Failure, Baltimore, MD.

RELATED POLICIES AND PROCEDURE(S)

- Consent policy
- Transfusion nursing practices and procedures (?)
- Massive transfusion protocol
- Sepsis protocol
- Acute liver failure protocol

Effective/Revision Dates for Policy # <insert policy number>		
Effective:	00/00/0000	<replace with revising committee name>
Revised:	00/00/0000	
	00/00/0000	
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Keywords:		