

Blood Product Transfusion Indications – Red Blood Cells (RBC) Actively Bleeding

PEDIATRIC ANEMIA – ACTIVELY BLEEDING INDICATIONS:

PEDIATRIC Transfusion Indications for ages greater than 4 months.

Note: Blood Volume is 80 mL/kg in children. 10-15 mL/kg of RBC will generally result in an increase Hct 6 – 9% or Hgb 2 – 3 g/dL.

- Acute loss of greater than 30% of blood volume unresponsive to fluid resuscitation or with on-going blood loss.
- Hgb less than 7 g/dL in critically ill children, or those at risk for critical illness, or with non-life threatening bleeding.
- Hgb less than 10 g/dL in critically ill children with acute brain injury.
- Other:

NEONATAL ANEMIA INDICATIONS:

NEONATAL Transfusion Indications for ages 4 months and less.

Note: Dose is 15 to 20 mL/kg over 3 to 4 hours. This will raise the Hgb by 3 – 4 g/dL and Hct by 9 – 12%.

Consider dividing the dose and administering 12 hours apart if circulatory overload is an issue.

- Hct less than or equal to 35%: Infant requiring ventilator respiratory support or higher FiO2 needs
- Hct less than or equal to 30%: Infant requiring NCPAP respiratory support or higher nasal cannula O2
- Hct less than or equal to 25%: Infant requiring a small amount of nasal cannula O2, no other respiratory support, and has some sign of anemia (persisting tachycardia or tachypnea, increased O2 requirement, increase in apnea/bradycardia, anticipated surgery)
- Hct less than or equal to 21%: Infant with no symptoms, minimal or no supplemental O2, and low absolute reticulocyte count (less than 100,000/mm³)
- Other:

Blood Product Transfusion Indications – Red Blood Cells (RBC) Not Actively Bleeding

PEDIATRIC ANEMIA – NOT ACTIVELY BLEEDING INDICATIONS:

PEDIATRIC Transfusion Indications for ages greater than 4 months.

Note: Blood Volume is 80 mL/kg in children. 10-15 mL/kg of RBC will generally result in an increase Hct 6 – 9% or Hgb 2 – 3 g/dL.

- Hgb less than 5 g/dL in a non-bleeding patient whose anemia is unresponsive to non-transfusion therapy such as intravenous iron or erythropoietic stimulating agents.
- Pre-operative Hgb less than or equal to 6 g/dL when alternative therapy is not available and significant surgical blood loss anticipated.
- Hgb less than 7 g/dL in critically ill children that are non-hemorrhagic and hemodynamically stable.
- Hgb less than 8 g/dL in critically ill children or those at risk for critical illness with an oncologic diagnosis.
- Chronic transfusion for hemoglobinopathy. Should be matched for Rh and Kell antigens. Consult Blood Bank.
- Hgb less than 7 g/dL in critically ill children with severe sepsis or septic shock that are hemodynamically stable.
- Hgb less than 10 g/dL in critically ill children with acute brain injury.
- Hgb less than 7 g/dL in critically ill children with congenital heart disease.
- Hgb less than 7 g/dL in critically ill children with respiratory failure AND signs/symptoms of anemia without expected response to medical therapy.¹
- Sickle Cell Disease:** Pre-op hgb less than 10 g/dL in critically ill children with sickle cell disease requiring surgery with a general anesthetic.
- Sickle Cell Disease:** Additive transfusion for splenic or hepatic sequestration or aplastic crisis.
- Sickle Cell Disease:** Exchange transfusion for acute chest syndrome, stroke or priapism. Consult Blood Bank.
- Sickle Cell Disease:** Hypertransfusion to prevent recurrent stroke, deterioration in end organ failure, etc.
- Sickle Cell Disease:** Pre-operatively before major procedures.
- Other:

¹Signs/symptoms of anemia and/or tissue hypoxia are tachycardia, hypotension, new EKG changes, mixed venous oxygen saturation less than 55%, or clinical evidence of myocardial ischemia.

Blood Product Transfusion Indications – Platelets

PEDIATRIC PROPHYLACTIC INDICATIONS:

PEDIATRIC Transfusion Indications for ages greater than 4 months.

- Platelet count less than 10,000/mm³ in a stable patient with failure of platelet production.
- Platelet count less than 20,000/mm³ in a febrile patient with failure of platelet production and presence of minor bleeding or factor deficiency or associated coagulopathy.
- Other:

PEDIATRIC PERI-PROCEDURE or THERAPEUTIC INDICATIONS:

PEDIATRIC Transfusion Indications for ages greater than 4 months.

- Major invasive procedure including surgery:** Platelet count less than or equal to 50,000/mm³ in a stable patient OR platelet count less than 75,000/mm³ with associated coagulopathy.
- Lumbar Puncture (Diagnostic):** Platelet count less than 50,000/mm³ or less than 80,000/mm³ with associated platelet dysfunction, or coagulopathy (INR greater than 1.7).
- Arteriotomy, nephrostomy, kidney biopsy, paracentesis, thoracentesis, liver biopsy:** Platelet count less than 30,000/mm³ in a stable patient OR platelet count less than 50,000/mm³ with an associated coagulopathy.
- Significant Hemorrhage:** Platelet count less than 75,000/mm³
- Endoscopy or Bronchoscopy WITHOUT Biopsy:** Platelet count less than 20,000/mm³
- Bone Marrow Biopsy:** Platelet count less than 10,000/mm³
- Elective Splenectomy for ITP:** Platelet count less than 10,000/mm³
- CNS Bleeding:** Platelet count less than 100,000/mm³ or EXTEM A10 less than 40 mm and FIBTEM A10 greater than or equal to 10 mm or EXTEM MCF less than 50 mm and FIBTEM MCF greater than or equal to 10 mm (ROTEM available at EMMC only).
- Patient with known congenital or acquired defects in platelet function with critical bleeding or before major surgery regardless of platelet count. **Perform Platelet Function Screen test to confirm defect.**
- Other:

NEONATAL PROPHYLACTIC INDICATIONS:

NEONATAL Transfusion Indications for ages 4 months and less.

- Platelet count less than 20,000/mm³ in a patient with failure of platelet production.
- Platelet count less than 30,000/mm³ in a patient with neonatal alloimmune thrombocytopenia.
Note: Platelets should be negative for HPA Antigen.
- Platelet count less than 50,000/mm³ in a patient with failure of platelet production and presence of minor bleeding or factor deficiency or associated coagulopathy.
- Other:

NEONATAL PERI-PROCEDURE or THERAPEUTIC INDICATIONS:

NEONATAL Transfusion Indications for ages 4 months and less.

- Major invasive procedure including surgery:** Platelet count less than 75,000/mm³ in a stable patient OR platelet count less than 100,000/mm³ with an associated coagulopathy.
- Lumbar Puncture (Diagnostic):** Platelet count less than 50,000/mm³ in a stable patient or platelet count less than 80,000/mm³ with associated platelet dysfunction, or coagulopathy (INR greater than 1.7).
- Significant Hemorrhage:** Platelet count less than 75,000/mm³
- Endoscopy or Bronchoscopy WITHOUT Biopsy:** Platelet count less than 20,000/mm³
- Bone Marrow Biopsy:** Platelet count less than 10,000/mm³
- CNS Bleeding:** Platelet count less than 100,000/mm³ or EXTEM A10 less than 40 mm and FIBTEM A10 greater than or equal to 10 mm or EXTEM MCF less than 50 mm and FIBTEM MCF greater than or equal to 10 mm (ROTEM available at EMMC only).
- Patient with known congenital or acquired defects in platelet function with critical bleeding or before major surgery regardless of platelet count. **Perform Platelet Function Screen test to confirm defect.**
- Other:

Blood Product Transfusion Indications – Frozen Plasma (FP)

PEDIATRIC or NEONATAL THERAPEUTIC INDICATIONS:

PEDIATRIC Transfusion Indications for ages greater than 4 months.

NEONATAL Transfusion Indications for ages 4 months and less.

- Serious or life-threatening bleeding¹ and INR greater than 1.7 and/or PTT greater than 45 seconds.**

Note: If PTT is greater than 45 seconds and INR is less than or equal to 1.7, rule out heparin or lupus anticoagulant first. If fibrinogen is less than 150 mg/dL and hemorrhage is present, consider Cryoprecipitate or Fibrinogen Concentrate (RiaSTAP).

- Intracranial hemorrhage and INR greater than 1.5
 Thrombotic thrombocytopenia purpura as part of plasma exchange transfusion.
 Other: _____

PEDIATRIC or NEONATAL PROPHYLACTIC INDICATIONS:

PEDIATRIC Transfusion Indications for ages greater than 4 months.

NEONATAL Transfusion Indications for ages 4 months and less.

- Prophylactic Frozen Plasma (FP) is rarely indicated.
 - Prothrombin Complex Concentrate (Kcentra) may be preferred for rapid/emergent correction.
 - Oral and/or IV Phytonadione (Vitamin K) should always be considered as first line therapy to correct a prolonged INR.
 - Vitamin K should always be used with Prothrombin Complex Concentrate or FP.
 - Superficial fine needle aspiration may be done at any INR.
- PTT greater than 45 seconds due to factor deficiency other than Factors 2, 7, 8, 9, or 10 (rule out heparin or lupus anticoagulant first).
- Before paracentesis and INR greater than 3
- Before thoracentesis, liver biopsy, or other invasive procedure (except paracentesis) and INR greater than 2
- Immediate need for surgical intervention¹, INR greater than 1.9 and insufficient time for, or patient unresponsive to, Vitamin K.
- Before epidural catheter placement or removal AND INR greater than 1.7
- Before arteriotomy, nephrostomy, or kidney biopsy and INR greater than 1.7
- Before lumbar puncture and INR greater than 1.7
- Before surgery involving the neuroaxis and INR greater than 1.5
- Other: _____

¹Consider use of Prothrombin Complex Concentrate if need for surgical intervention is an emergency.

- Patients with liver disease or those taking Warfarin (Coumadin) may safely undergo operative or invasive procedures (EXCEPT lumbar puncture – see above) when the INR is less than 2.
- Do not use FP when coagulopathy can be corrected with Vitamin K except in the above circumstances.
- Do not use FP as a source of intravascular volume repletion.
- Reference: *The Pharmacology & Management of Vitamin K Antagonists*, Chest, (141), 2012.

Blood Product Transfusion Indications – Cryoprecipitate

PEDIATRIC or NEONATAL INDICATIONS:

PEDIATRIC Transfusion Indications for ages greater than 4 months.

NEONATAL Transfusion Indications for ages 4 months and less.

- Congenital fibrinogen deficiency and fibrinogen less than 100 mg/dL.
- Bleeding and congenital fibrinogen deficiency.
- Bleeding due to coagulopathy with fibrinogen concentration less than 125 mg/dL.
- Fibrinogen less than 125 mg/dL in the setting of acute promyelocytic leukemia.
- Fibrinogen less than 150 mg/dL in the setting of massive transfusion.
- Other: _____

Note:

- Fibrinogen Concentrate (RiaSTAP) may be considered as an alternative to Cryoprecipitate (EMMC and Mercy only).
- The usual starting dose is 50 mg/kg. Its' only labeled indication is for use in congenital hypofibrinogenemia.
- It may not be appropriate for neonates due to the fact that the smallest vial contains 1 g of fibrinogen making it cost prohibitive if more than half the dose must be discarded.

References:

Consensus Recommendations for RBC Transfusion Practice in Critically Ill Children. *Ped Crit Care Med*. Sept 2018;19(9): 884-98.
Evidence-based Management of Anticoagulant Therapy. *Chest*. Feb 2012;141(2 Suppl):152S-184S