Clinician’s Guide to Transfusion Therapy: Indications for Ordering

Scott Scrape, MD

August 31, 2011
Second Edition

Contents
Indications for ordering:

- Packed red blood cells (PRBC)
- Platelets
- Fresh frozen plasma (FFP) and thawed plasma
- Cryoprecipitate
- Irradiated blood products to prevent graft-versus-host disease (GVHD)
- Cytomegalovirus (CMV) negative blood products
- Therapeutic plasma exchange (TPE)

Quality Measures

- Proportion of units prepared and not transfused: PRBC, FFP, platelets
- Inappropriate blood utilization: PRBC, FFP, platelets
- Frequency with which Hgb/HCT rechecked prior to transfusion of second unit of PRBC in the setting of non-emergent transfusion

Note: Data are collected through the Blood Bank database

Disclaimer: Clinical practice guidelines and algorithms at The Ohio State University Medical Center (OSUMC) are standards that are intended to provide general guidance to clinicians. Patient choice and clinician judgment must remain central to the selection of diagnostic tests and therapy. OSUMC’s guidelines and algorithms are reviewed periodically for consistency with new evidence; however, new developments may not be represented.

Copyright © 2011, The Ohio State University Medical Center. No part of this publication may be reproduced in any form without permission in writing from The Ohio State University Medical Center.

If you have questions, please contact Quality and Operations Improvement at QualityUpdates@osumc.edu or 293-8430.
Clinician’s Guide to Transfusion Therapy

Indications for Ordering
Not indicated for situations requiring massive transfusion of blood products. (Contact Transfusion Services at 293-8467 for information. Note: Person ordering massive transfusion must be an attending.) (See “Massive Transfusion Protocol (MTP)” on page 8 of the “Blood and Blood Products in the Perioperative Department” Policy: https://onesource.osumc.edu/departments/PerioperativeServices/Documents/UHRossPolicies/BLOOD%20AND%20BLOOD%20PRODUCTS%20IN%20THE%20PERIOPERATIVE%20DEPARTMENT.pdf)

Packed Red Blood Cells (PRBCs)

Note: All PRBCs are now leukoreduced
- Hgb < 7.0 g/dL.
- Symptomatic with Hgb > 7 g/dL.
- Cardiac disease, especially if Hgb < 8.0 g/dL.
- Acute blood loss > 20% of blood volume (70 ml/kg).
- Rare clinical benefit if Hgb > 10.0 g/dl.
- For non-emergent transfusion, order one unit of RBC rather than two. Recheck Hgb/Hct upon completion of first unit. Transfuse the second unit only if above criteria are met.

PRBCs for the Cancer Patient
Prevent or treat deficit of oxygen-carrying capacity in a patient population whose therapy often reduces the ability to make PRBCs. See National Comprehensive Cancer Network (NCCN) guidelines: http://www.nccn.org/professionals/physician_gls/f_guidelines.asp

Asymptomatic
- Hemodynamically stable chronic anemia without acute coronary syndrome: Transfusion goal to maintain hemoglobin 7 – 9 g/dL.

Symptomatic
- Acute hemorrhage with evidence of hemodynamic instability or inadequate oxygen delivery: Transfuse to correct hemodynamic instability and maintain adequate oxygen delivery.
- Symptomatic (including tachycardia, tachypnea, postural hypotension) anemia (hemoglobin < 10 g/dL): Transfusion goal to maintain hemoglobin 8-10 g/dL as needed for prevention of symptoms.
- Anemia in setting of acute coronary syndromes or acute myocardial infarction: Transfusion goal to maintain hemoglobin 8-10 g/dL.

Platelets

Notes:
1. Platelets may not be immediately available.
2. All platelets at OSUMC are leukoreduced.
3. Patient may have suboptimal response.
- Chronic stable thrombocytopenia < 5,000/µL.
- Platelets <10,000/µL: Bone marrow failure, acute leukemia, bone marrow transplant, solid tumors.
- Platelets < 20,000/µL: Sepsis or other hemostatic disorders, bronchial alveolar lavage (BAL), brain tumor, or bone marrow biopsy (Heme/Onc).
- Platelets < 50,000/µL: Disseminated intravascular coagulation (DIC) and hemorrhage, percutaneous or endoscopic biopsy, lumbar puncture, or major surgery.
- Platelets <100,000/µL: Acute massive hemorrhage, neurosurgery, or left ventricular assist device (LVAD).
- Platelet function disorders: >100,000/µL.

If Patient Not Responsive to Platelets
- Routinely check post-transfusion platelet count 10 minutes to 1 hour.
- Repeated poor responses indicate immune refractoriness.
  - Consult Transfusion Medicine Service in anticipation of need for human leukocyte antigen (HLA) matched or cross-matched platelets.
  - Calculate the corrected count increment (CCI): (Platelet count post – Platelet count pre) x Body Surface Area / Number of Platelets Transfused
  - CCI < 5000 platelets x m² per µL indicative of nonresponsiveness (1 hour post-transfusion CCI after two consecutive platelet transfusions)

Fresh Frozen Plasma (FFP), Thawed Plasma

- INR ≥ to 1.5: Invasive procedure or active bleeding.
  - No evidence INR < 1.5 reduces risk of hemorrhage.
- Active hemorrhage with PTT more than 60 seconds; exclude lupus anticoagulant or heparin.
- Hemorrhage with severe liver disease, DIC, vitamin K depletion.
- Replace diluted and consumed coagulation factors in massive transfusion.
- Fibrinogen <100 mg/dL.

Cryoprecipitate

- Indicated when correction of fibrinogen-related coagulopathy is needed but volume of FFP will not be tolerated.
- Fibrinogen <100 mg/dL and bleeding, invasive procedure, or volume overload.
  - Pool of cryoprecipitate (5 donors) = 2-3 units plasma (2-3 donors).
- Fibrinogen < 150 in DIC

Irradiated Blood Products to Prevent Graft-Versus-Host-Disease (GVHD)

Indications:
- Bone marrow transplant.
- Severe congenital or acquired immuno-deficiency.
- Neonatal exchange transfusion.
- Cellular blood components from blood relatives (directed donation).
- Hodgkin’s disease, lymphoma, acute myelogenous leukemia (AML), chronic lymphocytic leukemia (CLL), acute lymphocytic leukemia (ALL) – (other malignancies less likely).
• HLA-matched platelet pheresis.

Cytomegalovirus (CMV) Negative Blood Products

**Indications:**
- Allogeneic (related or unrelated donor) bone marrow transplant if CMV sero-negative.
- CMV sero-negative acute leukemia and bone marrow transplant candidates.
- CMV sero-negative heart and lung transplant recipients and candidates.
- CMV sero-negative (or unknown) pregnant women.
- CMV unknown, order test.
- All fetuses and low-birth-weight neonates.
- Liver, kidney, and pancreas transplant receive leukocyte-reduced blood components (CMV-safe).

**Therapeutic Plasma Exchange (TPE)**

*Consult* apheresis service: 614-293-8672 (order placed under Ancillary/Apheresis)

**Indications:**

**Neurologic Disorders**
- **Conditions:** Chronic inflammatory demyelinating polyneuropathy, Guillain-Barre syndrome, polyneuropathies associated with IgG and IgA monoclonal gammopathies of undetermined significance.
- **TPE:** 200-250 mL/kg over 3-6 procedures.

**Other Neurologic Disorders**
- **Conditions:** Myasthenia gravis, Lambert-Eaton myasthenic syndrome, chronic inflammatory demyelinating polyneuropathy.
- **TPE:** Frequency and duration determined by patient’s clinical status.
  - **Initial management** — usually 5-8 treatments over 2-3 weeks.
  - **Maintenance therapy** — for myasthenia, usually 1-2 exchanges per month to reduce need for prednisone and other immunosuppressants.
  - **Consult** — neuromuscular specialist to confirm diagnosis and for appropriate ancillary pharmacologic and supportive therapy.

**Hematological Disorders**
- **Conditions:** Thrombotic thrombocytopenic purpura (TTP), hyperviscosity syndrome associated with paraproteins — usually IgM, cryoglobulinemia.
- **TPE:** Frequency and duration determined by patient’s clinical status.
  - **Consult** - Hematology

**Renal Disease**

- **Conditions:**
  - **Solid Organ Transplantation.** Post-transplant antibody mediated rejection, recurrent focal segmental glomerulosclerosis.
  - **Native Kidney Disease.** Thrombotic thrombocytopenic purpura (TTP), Goodpasture’s syndrome, cryoglobulinemia, light chain deposition disease.
- **TPE:** Frequency and duration determined by patient’s clinical status.

**If Emergency After-Hours Procedure**

- Call the pathology resident on-call.
  - New onset leukemia with elevated WBC
  - RBC exchange for sickle crisis
  - TTP
- Place apheresis catheter if necessary, and verify with X-ray, except for femoral line.

**Special Circumstances**

- Acute Leukemia.

**References**