Newborn Critical Care Center (NCCC) Clinical Guidelines

Transfusion of Blood Products

GENERAL INFORMATION
The most common cause of early neonatal anemia is blood sampling; make every effort to limit withdrawal of blood for diagnostic purposes. For inborn VLBW infants, the provider should collect a cord blood sample at the time of delivery for any initial laboratory sample needs, e.g. blood culture, CBC, Type and Screen.

Other causes of anemia in the neonate that should be considered include:
- Hemolysis
- Intrapartum hemorrhage
- Neonatal hemorrhage
- Physiologic anemia / anemia of prematurity

At UNC Hospitals, each infant in the neonatal unit is assigned a packed red cell unit upon their first transfusion. Subsequent transfusions are taken from this designated unit, decreasing exposures to blood donors and thereby reducing the risks associated with transfusion. If the volume of transfusions exceeds the volume of the unit or if the unit expires (> 42 days), a new unit will be assigned to the patient. Infant type and screen samples expire after 4 months (NOT 120 days) unless discharged first.

For the family of Jehovah’s Witness faith - please refer to the accompanying hospital protocol.

GUIDELINES FOR PACKED RED CELL ADMINISTRATION

- The volume of RBC transfusion should equal 15 mL/kg unless the infant is volume sensitive
- There must be a signed consent form on the chart for blood product administration unless there is a life-threatening issue
  1. Hep B 1: 843,000 to 1:2,008,000
  2. Hep C 1:1,149,000
  3. HIV 1:1,467,000
  4. HTLV < 1:1,000,000
  5. Parvo B19 1:20,000- 1:50,000
  6. Bacteria 1:6000

The following guidelines incorporate information from the American Red Cross recommendations and the PINT and Bell et al RCTs. Results of the TOP Trial will likely be available at the time of the next guideline review. (https://clinicaltrials.gov/ct2/show/NCT01702805)
GUIDELINES FOR PLATELET ADMINISTRATION

- The volume of transfusion should equal 10 - 15 mL/kg
- Once delivered to the unit, platelets must be transfused within 4 hours
- It is not recommended to use platelets as colloid or volume expansion in the setting of critical illness or hypotension, given emerging evidence that platelet transfusions are independently associated with increased mortality and a variety of adverse events in a dose-dependent manner.

The following guideline is based on American Red Cross recommendations and the Curley, et. al. RCT.
### GUIDELINES FOR FRESH FROZEN PLASMA (FFP) ADMINISTRATION

- The volume of transfusion should equal 10 - 15 mL/kg
- FFP can be used for 6 hours after preparation
- Once delivered to the unit, FFP must be transfused within 4 hours
- All FFP is irradiated for infants less than 4 months or until discharge, whichever occurs later

<table>
<thead>
<tr>
<th>FOR INFANTS ≤ 4 MONTHS OF AGE</th>
<th>Platelet count &lt; 100,000</th>
<th>Platelet count &lt; 50,000</th>
<th>Platelet count &lt; 30,000</th>
<th>Platelet count &lt; 20,000</th>
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<tbody>
<tr>
<td></td>
<td>• ECMO</td>
<td>• Active bleeding</td>
<td>• Stable preterm infant</td>
<td>• Stable term infant</td>
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<td>• Pre- or post-operatively up to 48 hours</td>
<td>• Unstable/ill preterm neonate</td>
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<td>• Infant ≤ 30 weeks gestational age for the first 72 hours of life (due to risk of IVH in VLBW)</td>
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### FOR INFANTS > 4 MONTHS OF AGE

#### THROMBOCYTOPENIA

- Platelet count < 10,000
  - Failure of platelet production

- Platelet count < 50,000
  - Stable non-neonate with one of the following:
    - Active bleeding
    - Before an invasive procedure with failure of platelet production
    - Post-operatively up to 48 hours

#### NO THROMBOCYTOPENIA

- Active bleeding in association with qualitative platelet defect
- Unexplained excessive bleeding in anticoagulated infant
<table>
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<tr>
<th>FOR INFANTS $\leq 4$ MONTHS</th>
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<tr>
<td><strong>Any of the following:</strong></td>
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<tr>
<td>• Active bleeding</td>
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<td>• Refractory hypotension</td>
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<td>• Sepsis</td>
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<th>FOR INFANTS $&gt; 4$ MONTHS</th>
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<tr>
<td>• PT and/or PTT $&gt; 1.5$ times the mean normal value in a non-bleeding patient scheduled for surgery or invasive procedure</td>
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<td>• Diffuse microvascular bleeding in a patient given one or more blood products and PT and/or PTT $&gt; 1.5$ times the mean normal value or not yet available</td>
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<td>• Acute blood loss</td>
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<td>• Other indications may include TTP, ITP, emergency reversal of warfarin and treatment of plasma anticoagulant deficiencies such as protein C, protein S or antithrombin III when specific therapy is not available or advisable</td>
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<tr>
<th>GUIDELINES FOR CRYOPRECIPITATE ADMINISTRATION</th>
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<tr>
<td>• The volume of transfusion should equal 10 - 15 mL/kg</td>
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<tr>
<td>• Enriched with von Willebrand factor, fibrinogen, and factor VIII</td>
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<tr>
<td>• Each unit of cryoprecipitate contains $&gt; 150$ mg of fibrinogen and $&gt; 80$ international units of factor VIII</td>
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<tr>
<th>FOR ALL INFANTS</th>
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<tr>
<td>• Hypofibrinogenemia (fibrinogen $&lt; 100$ mg/dL) or dysfibrogenemia with active bleeding</td>
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<tr>
<td>• Hypofibrinogenemia or dysfibrogenemia while undergoing an invasive procedure</td>
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<td>• Von Willebrand disease with active bleeding but only when both of the following are true:</td>
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<tr>
<td>a. Desamino-D-arginine vasopressin (DDAVP) is contraindicated, not available, or does not elicit response <strong>AND</strong></td>
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<tr>
<td>b. Virus-inactivated plasma-derived factor VIII concentrate (which contains von Willebrand factor) is not available</td>
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DIRECT DONATION OF BLOOD PRODUCTS

Direct donation is discouraged for the NCCC population given the increased risks of directed donor blood and time constraints. To proceed with direct donation, contact the blood bank for procedure.

GENERAL PRINCIPLES

• Transfusion orders are located in the “Neonatal Procedure Focused” order set in Epic. Once opened, select the appropriate blood product.

• The “Prepare” order should include the volume to be transfused plus an additional 5 mL to prime the IV tubing. The “Transfuse” order should be written only for the desired transfusion volume. Both must be completed prior to submitting order.

• Furosemide (Lasix) should not be routinely ordered with transfusions.

• Blood components are typically given above total fluids, but may be given within total fluids if patient is extremely volume sensitive.

References:


Reviewed April 2019 – Orth / Laughon
APPENDIX A

TYPE AND SCREEN/BLOOD TYPE REFERENCE
Two blood samples are required for patients at risk for receiving a blood transfusion during their hospitalization.

IF PATIENT WAS BORN IN LABOR AND DELIVERY:
A sample for blood typing (ABO/Rh) should be sent on ALL NCCC admissions from L&D. If it is determined by the provider that a patient is at risk for a blood transfusion, a second sample for screening (TYPE AND SCREEN) should also be sent.

First Specimen:
OB will provide 1-2 mL of cord blood in a large lavender- or blue-topped tube and label it with mom’s sticker. Bring this tube back to the unit and affix the baby’s patient ID label to the specimen as well.
- This can be tested for BLOOD TYPE only (check type sample). The order in Epic appears as “cord blood type.”

Second Specimen:
A large lavender-topped tube with 1-2 mL of blood is required for the TYPE AND SCREEN.
- Do not send a bullet tube for this testing.
- Affix the large lab label along with an ID sticker to the specimen.
- The order in Epic appears as “Type and Screen.”

If L&D did not provide a cord blood sample:
A small tube/bullet tube is acceptable for confirmatory BLOOD TYPE (check type sample).
- This sample must be drawn at a different time and sent in a different bag from the large lavender tube for Type & Screen.
- The order in Epic appears as “ABO/Rh.”

IF PATIENT WAS AN OUTSIDE TRANSPORT:
Two different specimens are required.
Do not send both specimens to the lab in the same bag at the same time.

1. For the initial specimen (TYPE AND SCREEN): Collect 1-2 mL of blood and send in a large lavender-topped tube.
2. For the confirmatory BLOOD TYPE (check type sample): A small tube/bullet tube is fine to send for the confirmatory blood type (ABO/Rh) sample only.