Newborn Critical Care Center (NCCC) Clinical Guidelines

Postnatal Management of Red Cell Alloimmunization

BACKGROUND

Newborns exposed to maternal red cell alloimmunization are at increased risk for hemolytic disease of the newborn. This increased risk is reduced by prenatal intrauterine transfusion (IUT).

Most newborns treated with IUT will have an adequate hematocrit at birth. Postnatal blood typing will be influenced by the proportion of circulating RBCs from the donor at the time of birth, and thus may not reflect the typing of the newborn's own cells. While it is rare, some newborns treated with IUT will still require early postnatal therapy including intensive phototherapy, intravenous immunoglobulin (IVIG) and exchange transfusion.

Special follow-up is required for all newborns exposed to maternal red cell alloimmunization (regardless of IUT status) due to the increased risk of anemia**.** Newly made RBCs released by the bone marrow will continue to be eliminated while maternal antibodies remain in circulation. In some cases, the resulting anemia can be severe and lead to failure to thrive. For newborns treated with IUT, the presentation of anemia will be delayed until the donor RBCs senesce (age) and are removed from the circulation.

MANAGEMENT OF THE NEWBORN TREATED WITH IUT

Immediately After Delivery*:*

1. Send cord blood for type, Direct Coombs, and neobilirubin level
2. Notify the LIP in Newborn Nursery who will be responsible for the infant to ensure prompt follow-up of pending laboratory work
3. Start intensive phototherapy* immediately for cord bilirubin >/= 2 mg/dL

At 12 and 24 Hours of Life:

1. Repeat neobilirubin level and calculate the rate of rise
2. Begin intensive phototherapy* if rate of rise is >/= 0.5 mg/dL/hr
3. Continue to follow neobilirubin level closely (interval determined on an individualized basis) to determine need for further intervention
4. **Transfer to NCCC** if rate of rise >/= 0.5 mg/dL/hr despite intensive phototherapy **OR** if you anticipate the need for blood transfusion/exchange transfusion

MANAGEMENT OF THE NEWBORN NOT TREATED WITH IUT

Immediately After Delivery *(Consider direct admission to NCCC):*

1. Send cord blood for type, Direct Coombs, hematocrit, reticulocyte count, and neobilirubin level
2. Notify the LIP in Newborn Nursery who will be responsible for the infant to ensure prompt follow-up of pending laboratory work
3. Begin intensive phototherapy* immediately for cord bilirubin >/= 2 mg/dL

4. Consider double phototherapy if cord bilirubin >2 mg/dL AND < 6 mg/dL
5. **Transfer infant to NCCC** for cord bilirubin >/= 6 mg/dL or hematocrit < 25%

At 2-4 Hours of Life:

1. Repeat hematocrit and neobilirubin level and calculate the rate of rise
2. Begin intensive phototherapy* if rate of rise is >/= 0.5 mg/dL/hr
3. Continue to follow hematocrit and neobilirubin level closely (interval determined on an individualized basis) to determine need for further intervention
4. **Transfer to NCCC** if rate of rise >/= 0.5 mg/dL/hr despite intensive phototherapy **OR** if you anticipate the need for blood transfusion/exchange transfusion

IF ADMITTED TO THE NCCC:

1. Send blood for type and screen
2. Obtain consent for administration of blood products
3. Provide intensive phototherapy* for cord bilirubin >/= 6 mg/dL
4. Administer intravenous immunoglobulin (IVIG) if the neobilirubin is within 2 to 3 mg/dL of exchange level; also consider IVIG if the neobilirubin is rising despite intensive phototherapy
5. If double volume exchange transfusion appears to be imminent, notify Blood Bank immediately, as it takes **at least 4 hours** to screen and modify blood to be used for exchange transfusions. (*See Exchange Transfusion Guidelines*)
6. Transfuse PRBCs as indicated; in general, hematocrit <22-24% or hemoglobin < 8 mg/dL warrants transfusion

*Intensive phototherapy implies irradiance in the blue-green spectrum of at least 30μW/cm² per nm (measured at the infant's skin directly below the center of the phototherapy unit)

For additional recommendations on phototherapy and exchange transfusion, refer to the NCCC Phototherapy Guidelines and Exchange Transfusion Guidelines.

DISCHARGE PLANNING FOR ALL NEWBORNS WITH RED CELL ALLOIMMUNIZATION

1. Initiate oral iron supplementation (3-6 mg/kg/day) once enteral feedings are established.
2. Obtain hematocrit with reticulocyte count prior to discharge.
3. Consult Pediatric Hematology/Oncology.
    a. In general, hematocrit and reticulocyte count should be followed weekly until the hematocrit is stable and the reticulocyte count is rising for two consecutive weeks.
    b. *For newborns treated with IUT*, recombinant erythropoietin (rhEpo) or its longer-acting analog darbepoetin may be used to reduce or prevent the need for transfusion.
        i. **rhEpo** is given subcutaneously at **400 U/kg** three times weekly q2 weeks
        ii. **Darbepoetin** is given as a single **4 mg/kg** subcutaneous dose q1-2 weeks

References:

1. American Academy of Pediatrics. (2004). Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. *Pediatrics*, *114*(1), 297-316.
2. American Academy of Pediatrics. (2011). Phototherapy to Prevent Severe Neonatal Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation. *Pediatrics,* 128(4):e1046-e1052).

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