Blood Preservation, Transfusion, Erythropoiesis Stimulating Agents, and Iron Guideline

v.7-29-25

Goal: optimize long-term outcomes by reducing transfusions, improving red cell mass and maintaining iron sufficiency in high-risk neonates.

Transfusions of pRBCs are common in preterm infants during their hospitalization (**1-5**). They are associated with morbidities in preterm infants including BPD, NEC, ROP, and decreased neurocognitive outcomes (**5-13**). Utilizing a multi-prong strategy to preserve blood, restrict transfusions according to consensus evidence-based guidelines, and enhancement of erythropoiesis may contribute to overall better outcomes in preterm infants (**13-15**). Careful attention to maintaining iron sufficiency is necessary to avoid additional risk for poor neurocognitive outcomes.

1. Blood preservation (all neonates) IA-IIb:

- DCC 60+ seconds whenever possible – few exceptions
- Cord blood for labs (**for infants < 34 weeks, SGA, IDM or at risk for iron overload i.e. intrauterine transfusions**): CBC/diff, retic, RetHe, +/- blood culture (arterial side most accurate). (**21-23**)
- Minimize phlebotomy – every lab and every stick should be considered. Use TCOM, ETCO2 whenever possible. Review and update our current lab guideline regularly.
- Avoid UAC when appropriate; remove as soon as possible
- Work with SL Laboratory services to update to latest technology to allow minimizing sample volumes.

2. Follow St. Luke's Neonatology guidelines for restrictive transfusion thresholds (2024 publication):

- **NICU Blood Product Transfusion Guidelines**

3. ESA utilization to optimize red cell mass in high risk infants IIa-IIb:

- Target population ≤30 weeks and/or ≤1250g; congenital anemia due to hemorrhage, congenital anomalies requiring surgeries. (**15**)
- Infants with DAT+ hemolytic disease (ABO, Rh, minor antigens) including signs of active hemolysis and red cell depletion
- Infants with BPD can benefit from ESA use up to 38 weeks (frequent lab draws, need for optimal O2 carrying capacity)
- Darbe is the preferred ESA due to less frequent dosing (now on SL formulary, order in Epic)
- Begin Darbe 10 mcg/kg on DOL 7. Do not withhold Darbe for transfusions. (**15**)
- Begin enteral iron supplements on DOL 7 at 8 mg/kg/day if infant is tolerating enteral feeds of ≥80 ml/kg/day). Adjustments see below. (**15**)
- IV iron supplementation should be started on DOL 7 and given weekly for those infants on inadequate enteral feedings (<80 ml/kg/day). Use Iron sucrose 3 mg/kg or low molecular weight iron dextran 7 mg/kg. (**5, 15, 26-30**)
- Do not order *scheduled* dosing for Darbe (q week, q14d, etc.). Place each order only after reviewing recent labs for Fe sufficiency.

Medication	Route	Dose	Frequency
Darbepoetin	SQ/IV	10 mcg/kg/day	Q two weeks
Iron (ferrous sulfate)	PO	6-12 mg/kg/day	Daily, divided q12h when ≥ 8 mg/kg/day. Use when infant taking ≥ 80 ml/kg/day enteral feeds.
Iron (iron sucrose)	IV	3-6 mg/kg	Starting dose 3mg/kg. Give once per week. Use when infant taking < 80 ml/kg/day enteral feeds.
Folate	PO	100 mcg/kg/day	Daily

4. Maintaining iron sufficiency and monitoring for infants on ESA:

- Goal RetHe is 29-38.
- Hgb/hct/retic from cord blood for infants at high risk for iron deficiency (less than 34 weeks, SGA, IDM)
- Hgb/hct/retic at DOL 14 and then every 2-4 weeks for infants on ESA (time with other draws; adjust timing based on risk, response, prior iron status)

5. Adjusting Enteral/Parental iron:

Condition/lab value	Iron adjustment (Enteral)	Iron adjustment (Parenteral)	Hct/retic/RetHe	ESA
RetHe <27	Increase iron by 4mg/kg/day to max of 12mg/kg/day	Increase iron by 2mg/kg/day to max of 6mg/kg/day (given weekly)	1-2 weeks	Hold
RetHe 27-28	Increase iron by 2-4mg/kg/day to max of 12mg/kg/day	Increase iron by 1mg/kg/day to max of 6mg/kg/day	1-2 weeks	Consider holding
RetHe 29-38	Continue current dose	Continue current dose	2-4 weeks	Continue
RetHe >38	Hold iron	Hold iron	1-2 weeks	Continue
Sepsis culture positive	Hold iron	Hold iron	1-2 weeks	Continue unless neutropenic
DV exchange transfusion for HA	Hold iron for 2 weeks	Hold iron for 2 weeks	2 weeks	Continue
35-38 weeks	Routine dosing	Routine dosing	Routine	Discontinue
Hct ≥50%	Routine dosing (unless RetHE is high or low)	Routine dosing (unless RetHE is high or low)	2-4 weeks or routine	Discontinue
Significant thromboembolic disease	Routine dosing	Routine dosing	Routine	Discontinue
Hypertension unresponsive to single agent	Routine	Routine	Routine	Routine

6. Discontinuation of ESA:

- Discontinue ESA at 35-38 weeks (see above)
- If Hct is ≥ 50% or significant thromboembolic disease or hypertension unresponsive to therapy (single agent).
- Do not hold ESA or iron for blood transfusions (except for DV exchange for hemolytic anemia – hold iron for 2 weeks)
- Do not give ESA or iron in culture proven sepsis with active neutropenia

7. General Iron recommendations for infants >30wks, not receiving ESA:

- 31 - 36 6/7 weeks, EBM/DHM: Begin oral Fe 3.5 mg/kg/day at 14 d/o. Home on PVS with Fe 1 ml PO daily.
- 31 - 36 6/7 weeks, PT formula: Begin oral Fe 2 mg/kg/day at 14 d/o. Home on PVS with Fe 0.5 ml PO daily.
- ≥ 37 weeks & FGR, SGA, or significant phlebotomy/blood loss: Begin oral Fe 2 mg/kg/day at 14 d/o. Home on PVS with Fe 0.5-1 ml PO daily (dose depends on discharge feeds).
- ≥ 37 weeks without significant phlebotomy/blood loss: No Fe inpatient or at discharge.
- For any infants >30 weeks with risk factors for anemia who are unable to take enteral feedings for >14 days, discuss possible parenteral Fe with RD.

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