

Intensive Care Nursery House staff Manual

Administration of Blood Products

INTRODUCTION: Most infants admitted to the ICN will require transfusion of blood or blood products. Because of the unique characteristics of ICN patients, special precautions and procedures are necessary when administering blood products to them. It is important to remember that, **except in an emergency, parental consent must be obtained before an infant is given a blood transfusion.**

TYPE AND CROSS-MATCH:

1. **Packed red blood cells (PRBCs)** should be type and Rh specific and, for untransfused newborn, cross-matched against the mother's blood.
2. **Platelets** should be type and Rh specific.

IRRADIATION of all blood products is routine for ICN patients. This is to prevent graft versus host disease in immuno-compromised patients. Because some patients require transfusion before their immune status is known, all blood products are irradiated.

CMV NEGATIVE whole blood, PRBCs, platelet and white blood cells should be given to immuno-compromised patients to prevent transfusion acquired CMV infection. However, because of the limited availability of CMV blood products, CMV negative products are given only to infants with birth weight <1.5 kg (and <4 months of age) and infants at high risk of being immune-deficient (*e.g.*, congenital heart disease).

SPECIFIC BLOOD PRODUCTS:

Note: **Whole blood** is almost never available from the Blood Bank. Transfusion therapy is done by administration of PRBCs and other specific blood products

1. **PRBC transfusion:** The main reason for PRBC transfusions in the first week of life in low birth weight infants is **anemia from phlebotomies for laboratory studies**. Preterm infants recover from anemia at 34-36 weeks of gestation. Endogenous erythropoietin (EPO) is released when hematocrit (Hct) decreases to low 20s; reticulocytes increase 1 week later. Transfusion of infants at this point suppresses EPO and delays recovery.

Indications for PRBC transfusions:

A. Clinical hypovolemia and Hct <40% (see section on Neonatal Shock, P. 101). In an emergency CMV negative, irradiated O negative blood may be given without type and cross match by Attending order.

B. Anemia without evidence of hypovolemia

(1) **Infant with cardiopulmonary disease:**

- Severe (*e.g.*, RDS with $\bar{P}_{AW} \geq 10$ cm H₂O and >50% O₂, cyanotic heart disease, pulmonary hypoplasia on assisted ventilation and in >40% O₂): transfuse for Hct <40%
- Moderate (*e.g.*, RDS with lower ventilator settings, PDA, Chronic Lung Disease): transfuse for Hct <35%

- Mild (*e.g.*, nasal CPAP, head hood O₂): transfuse for Hct <30%
 - Apnea of Prematurity: transfuse for Hct <30% and worsening apnea (see section on Apnea, P. 91).
- (2) Stable, growing preterm infant: Consider transfusion
- If Hct <20% and reticulocyte count <100 x 10⁹/L.
 - If no weight gain for several days with adequate caloric intake, Hct <28% and other signs consistent with anemia (*e.g.*, tachycardia, tachypnea)
- (3) Infant with sepsis if Hct <30%
- (4) Infants with symptomatic heart disease: transfuse to keep Hct 40-45%. With large left-to-right shunt, maintain Hct in 50-55% range. Except in emergency, discuss with Cardiology before transfusing any infant with heart disease.

Transfusion volume: PRBCs must be infused within 4h of their release from Blood bank. Therefore,

A. Infuse 15 mL/kg over 1-3h *or*

B. Infuse 10mL/kg over 1-3h, check Hct 1h later and, if needed, give another 10 mL/kg from same quadpack (same donor).

C. Special Considerations

- For an infant unlikely to tolerate volume overload (*e.g.*, symptomatic PDA, Chronic Lung Disease), use **B** (above) and give furosemide (1mg/kg IV) after 1st transfusion.
- For all transfusions, check Hct 1-4 h after completion of the transfusion.
- If PRBCs are being given for volume resuscitation, give transfusion more rapidly, over 15-30 min.

2. Platelet transfusion: See section on Bleeding Disorders (P. 115) for causes of thrombocytopenia

- ¼ unit of platelets/kg will raise the platelet count more than 50,000
- give dried platelets for infants with concern for volume overload

Indications for platelet transfusion:

- Stable infant with platelets <20 x 10⁹/L
- Active bleeding with platelets <50 x 10⁹/L
- Platelets <50 x 10⁹/L in a “sick” infant (*e.g.*, preterm infant on mechanical ventilation)

Transfusion volume varies with condition. Usual starting volume is 10 mL/kg of platelets. For a term infant with birth weight >2.5 kg, transfuse 1 unit of platelets.

3. Plasma components are usually given for specific clotting deficiencies. See section on Bleeding Disorders (P. 115) for indications. **Note:** Fresh frozen plasma is to be used only for hemostasis. Treatment of hypovolemia is discussed in the section on Neonatal Shock (P. 101).