HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER MATERNITY AND CHILDREN HOSPITAL

Department:	Laboratory and Blood Bank		
Document:	Multidisciplinary Policy and Procedure		
Title:	Transfusion of Older Infants and Children		
Applies To:	Blood Bank Staff, Treating Physicians and Nurses		
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1. PURPOSE:

1.1 To ensure that blood & blood components are ordered for clinically appropriate conditions with a goal to optimize patient outcomes and ensure blood & blood components are used appropriately according to established standards taking into consideration the special transfusion practice in pediatric patients (More than 4 months of age).

2. DEFINITIONS:

2.1 Infant age start from one month to 1 year.

3. POLICY:

3.1 RBC transfusions in infants older than 4 months and children are similar to transfusions in adults. The most significant differences between this young group and adults are blood volume, the ability to tolerate blood loss, and age-appropriate hemoglobin and hematocrit levels.

3.2 General policies for blood components transfusion are to be considered.

4. PROCEDURE:

4.1 **RBC transfusion support:**

4.1.1 Indications: The most common indication for RBC transfusion is for the treatment or prevention of tissue hypoxia caused by decreased red cell mass:

4.1.1.1 Emergency surgical procedure in patients with significant postoperative anemia.

4.1.1.2 Preoperative anemia when other corrective therapy is not available.

4.1.1.3 Intraoperative blood loss >15% total blood volume.

4.1.1.4 Hematocrit <24% and:

4.1.1.4.1 In perioperative period, with signs and symptoms of anemia.

4.1.1.4.2 While on chemotherapy/radiotherapy.

4.1.1.4.3 Chronic congenital or acquired symptomatic anemia.

4.1.1.5 Acute blood loss with hypovolemia not responsive to other therapy.

4.1.1.6 Hematocrit <40% and:

4.1.1.6.1 With severe pulmonary disease.

4.1.1.6.2 On ECMO (extracorporeal membrane oxygenation).

4.1.1.7 Sickle cell disease and:

4.1.1.7.1 Cerebrovascular accident.

4.1.1.7.2 Acute chest syndrome.

4.1.1.7.3 Splenic sequestration.

4.1.1.7.4 Aplastic crisis.

4.1.1.7.5 Recurrent priapism.

4.1.1.7.6 Preoperatively when general anesthesia is planned (target hemoglobin 10 mg/dL).

4.1.1.8 Chronic transfusion programs for disorders of red cell production (e.g. β-thalassemia major and Diamond- Blackfan syndrome unresponsive to therapy).

4.1.2 Transfusion of chronic recipients (like sickle cell disease and B thalassemia): In addition to the common compatibility criteria, the following RBCs units should be selected:

4.1.2.1 Phenotypically matched RBCs (especially for Rh system and K) to prevent alloimmunization.

4.1.2.2 Sickle (Hb solubility test) negative units (as per availability).

4.1.2.3 Pre-storage leukoreduced units (as per availability).

4.1.2.4 Fresh units (≤ 7 days) as much as possible.

4.1.2.5 Irradiated units for patients who are candidates for stem cell transplantation (but not available in MCH blood bank).

4.1.2.6 RBCs transfusion to thalassemia patients must be fresh but in case of rare phenotype or in the presence of multiple alloantibodies, old blood may be used.

4.1.2.7 Phenotypically non matched RBCs bags may be released in:

4.1.2.7.1 Some cases with multiple antibodies or rare phenotype with non-availability of full phenotypically matched RBCs bags.

4.1.2.7.2 In emergency cases with no time for searching for phenotypically matched units.

4.1.2.8 Sickle cell disease:

4.1.2.8.1 In patients with sickle cell disease (SCD), chronic transfusion therapy reduces the risk of stroke by decreasing the percent of red cells containing hemoglobin S in order to reduce sickling and prevent an increase in blood viscosity.

4.1.2.8.2 Chronic transfusions can reduce the risk of recurrent stroke to less than 10% if hemoglobin levels are maintained between 8 and 9 g/dL with a hemoglobin S level less than 30%.

4.1.2.8.3 The method can be a simple, additive, or partial exchange transfusion, once every 3 to 4 weeks.

4.1.2.8.4 Of note, RBCs for patients with SCD should ideally be screened for hemoglobin S and leukocyte reduced to prevent HLA alloimmunization and platelet refractoriness in preparation for possible stem cell transplantation.

4.1.2.8.5 RBC Alloimmunization In SCD:

4.1.2.8.5.1 Patients with SCD have the highest rates of alloimmunization of any patient group. These antibodies are produced against common Rh, Kell, Duffy, and Kidd system antigens.

4.1.2.8.5.2 Many sickle cell treatment centers perform phenotype analysis of a patient's red cells before beginning transfusion therapy. This testing helps to reduce the rate of alloimmunization by allowing preferential selection of phenotypically similar units. Phenotypically compatible units may be difficult to obtain.

4.1.2.8.5.3 The most common protocol followed for nonalloimmunized patients is pre-transfusion phenotypic matching for C, c E, e and K antigens to prevent alloimmunization.

4.1.2.8.5.4 For patients receiving phenotypically matched RBC units, leukocyte reduction is also used to curtail wasting a matched unit whose leukocytes might cause a febrile non-hemolytic transfusion reaction.

4.1.2.8.6 Other Complications Of Red Cell Transfusions In SCD:

4.1.2.8.6.1 Patients with SCD may also be at risk for life-threatening delayed hemolytic transfusion reactions.

4.1.2.8.6.2 Furthermore, if a patient's hemoglobin level is observed to decrease after transfusion, one may suspect a "hyperhemolytic" syndrome. This phenomenon is characterized by destruction of the patient's own red cells along with transfused cells. The mechanism is not well understood.

4.1.2.8.6.3 If hyperhemolytic syndrome is suspected, one should consider stopping transfusion and administering corticosteroids in combination with intravenous immune globulin as noted in reported case studies.

4.1.2.9 Thalassemia:

4.1.2.9.1 Thalassemia with severe anemia must be treated with transfusion to improve tissue oxygenation and suppress extramedullary erythropoiesis in the liver, spleen, and marrow.

4.1.2.9.2 Supertransfusion protocols aim for higher target hemoglobin levels (11 to 12 g/dL).

4.1.2.9.3 Iron overload is a potential complication of this RBC transfusion protocol that cannot be prevented and must be treated with chelation therapy beginning early in childhood.

4.2 **Platelet and plasma support**:

4.2.1 The indications for platelet and plasma transfusion support are similar for older infants, children, and adults.

5. MATERIALS AND EQUIPMENT:

5.1 Hematos system of blood bank

6. RESPONSIBILITIES:

6.1 Blood bank staff has to follow the policy and procedures.

6.2 The treating physician should be guided by ordering guidelines, indications and contraindications of different blood products. He/She is solely responsible for deciding the need and prescribing blood component.

6.3 Staff Nurses

7. APPENDICES:

7.1 N/A

8. REFERENCES:

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8.5 AABB Standards for Blood Banks and Transfusion Services, 30th edition, 2016.

8.6 Mollison's Blood Transfusion in Clinical Medicine; 12th edition, 2014.

8.7 Modern Blood Banking & Transfusion Practices, 6th edition, 2012.

8.8 Guidelines for the use of fresh-frozen plasma, cryoprecipitate and cryosupernatant. British Committee for Standards in Haematology, Blood Transfusion Task Force. The British Society for Haematology, 2004; 126: 11–28.

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8.10 Australian & New Zealand Society of Blood Transfusion / The Royal Australian and New Zealand College of Obstetricians and Gynaecologists- 3rd Edition, March 2007.

8.11 Good Manufacturing Practice for Blood Establishments, Version 2.0, May 2019, Saudi FDA

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