UWMC Transfusion Guidelines

UW Medical Center Transfusion Practice Committee
Department of Transfusion Services

Overview

The University of Washington Academic Medical Center is committed to maximum patient safety and careful utilization in the use of these limited and costly community resources. When ordering blood components, please give careful consideration to the following points.

These should be considered "guidelines only" and not "standards" and the individual patient and clinical circumstances should be taken into account when considering the need for transfusion and its potential risks. These guidelines will be revised and updated at least annually and as appropriate when new evidence regarding transfusion indications and relative risks become available. We encourage you to seek consultation with Hematology and/or the Transfusion Service with questions regarding individual patients.

Red Blood Cells

A thoughtful transfusion policy is dependent on: the time the anemia developed over and can be expected to continue; additional medical problems that may make a patient more susceptible to anemia, such as tissue ischemia and pulmonary disease; and whether there is rapid, ongoing blood loss.

Human and animal studies reveal remarkable tolerance for hematocrit levels as low as 15%\(^\text{i,ii}\), but an optimum value has not been well defined and is very dependent on the patient’s physiologic state. A decrease in the hematocrit also involves a redistribution of blood flow away from the endocardium and may have adverse effects on ischemic cardiac tissue. A retrospective analysis of patients over aged 65 hospitalized with acute myocardial infarction found that in patients with a hematocrit less than 30.0% on admission, transfusion is associated with a lower 30-day mortality rate\(^\text{iii}\). Post-operative patients with known vascular disease and hematocrits <28% have been shown to have a significant increase in myocardial ischemia and morbid cardiac events\(^\text{iv}\). However, in a large multicenter, randomized trial, patients with cardiac disease did not have more adverse outcomes when a hemoglobin transfusion threshold of 7.0 g vs. 10 g was used\(^\text{v}\). In this study, less acutely ill younger patients without cardiac disease who were randomized to the more liberal transfusion trigger actually had an overall higher mortality rate. These same investigators also found that a restrictive RBC transfusion strategy does not adversely affect outcomes related to mechanical ventilation\(^\text{vi}\). In post-operative patients without cardiovascular disease few data support interference with wound healing or increased anesthesia risk at hemoglobin levels of <10 g/dl\(^\text{vi}\), and hemoglobin values as low as 7/g/dl appear to be safe in otherwise healthy individuals.

Red Blood Cell Transfusion – Guidelines:

- For patients without active cardiovascular ischemia a hemoglobin of < 7g (hct 21%) is a reasonable transfusion threshold.
- For patients with cardiovascular ischemia, and some patients over aged 65 and/or cardiovascular disease a hemoglobin < 10g (hct 30%) is a reasonable transfusion threshold.
- Patients with severe thrombocytopenia or platelet dysfunction may require higher hemoglobin levels. For example ≥ 9g (hct 27%) is a reasonable threshold and may improve platelet function.
Platelets

Spontaneous bleeding does not usually occur until the platelet count falls below 5,000 - 10,000/µL. The recommended “trigger” for prophylactic platelet transfusions in patients undergoing chemotherapy or hematopoietic stem cell transplantation is < 10,000/µL.

In a bleeding patient a platelet count above 50,000 should be maintained. In a surgical patient, the necessary platelet count varies depending on the procedure. For most surgeries 50,000/µL will be adequate. For high risk procedures, such as neurologic or ophthalmologic surgeries, neuraxial block, 100,000/µL is recommended.

A platelet count below the 50,000 guideline should prompt a discussion with the attending physician regarding the medical necessity of the procedure, alternatives, and the role of platelet transfusion. If a platelet transfusion is indicated and completed, but an adequate platelet count is not achieved with a single platelet transfusion, consultation with the hematology or attending medical director on call for the transfusion service is recommended.

Platelet Transfusion – Guidelines:

- In the absence of a major surgical insult or trauma, a platelet count of 10,000/mm³ or higher is usually adequate for normal coagulation.
- Prophylactic platelet transfusion generally has decreased effectiveness and is rarely indicated when thrombocytopenia is due to immune platelet destruction (e.g., idiopathic thrombocytopenic purpura.
- Prophylactic platelet transfusion is rarely indicated in surgical patients with thrombocytopenia due to decreased platelet production when the platelet count is greater than 100,000/mm³ and is usually indicated when the count is below 50,000/mm³. The determination of whether patients with intermediate platelet counts (50-100,000/mm³) require therapy should be based on the risk of bleeding. The platelet count at which surgical and obstetric patients are likely to experience increased bleeding is unknown. Performance of paracentesis and thoracentesis was not associated with increased bleeding in patients with platelet counts of 50-99,000/mm³.
- Patients undergoing procedures in which even capillary oozing is potentially life-threatening should be maintained at a higher platelet count (i.e., > 100,000/mm³ for craniotomy and other major neurosurgical procedures; > 50,000/mm³ for other potentially life-threatening procedures).
- Surgical and obstetric patients with microvascular bleeding usually require platelet transfusion if the platelet count is less than 50-100,000/mm³ and rarely require therapy if it is greater than 100,000/mm³. With intermediate platelet counts (50-100,000/mm³), the determination should be based on the patient's risk for more significant bleeding.
- Vaginal deliveries or operative procedures ordinarily associated with insignificant blood loss may be undertaken in patients with platelet counts less than 50,000/mm³.
- Platelet transfusion may be indicated despite an apparently adequate platelet count if there is known platelet dysfunction (e.g uremia) and/or microvascular bleeding.
**Fresh Frozen Plasma (FFP)**

Generally, there is an increase of at least 1.5 times the normal PT or PTT or an INR ≥ 1.6 before clinically important factor deficiency exists requiring FFP transfusion in the surgical or bleeding patient. This corresponds to factor levels <30% of normal.

**FFP Transfusion – Guidelines:**

- For urgent reversal of coumadin therapy.
- For correction of known coagulation factor deficiencies for which specific concentrates are unavailable.
- For correction of microvascular bleeding in the presence of elevated (>1.5 times normal) PT or PTT and normal fibrinogen level.
- For correction of microvascular bleeding secondary to coagulation factor deficiency in patients transfused with more than one blood volume and when PT and PTT cannot be obtained in a timely fashion.
- FFP should be given in doses calculated to achieve a minimum of 30% of plasma factor concentration (usually achieved with administration of 10-15 ml/kg of FFP), except for urgent reversal of warfarin anticoagulation, for which 5-8 ml/kg of FFP usually will suffice. Four to six packed platelet concentrates, or one unit of single-donor apheresis platelets provide a quantity of coagulation factors similar to that contained in one unit of FFP (except for decreased, but still hemostatic, concentrations of Factors V and VIII).
- The half life of Factor VII, the coagulation factor with the shortest t½, is approximately 3-6 hours and timing of FFP transfusion prior to procedures should take this into consideration.
- FFP is contraindicated for augmentation of plasma volume or albumin concentration.

**Cryoprecipitate**

Cryoprecipitate is indicated for bleeding or immediately prior to an invasive procedure in patients with significant hypofibrinogenemia (<100 mg/dL).

**Cryoprecipitate Transfusion – Guidelines:**

- Prophylaxis in nonbleeding perioperative or peripartum patients with congenital fibrinogen deficiencies (whenever possible, these decisions should be made in consultation with the patient’s hematologist).
- Correction of microvascular bleeding in massively transfused patients with fibrinogen concentrations less than 100 mg/dL (or when fibrinogen concentrations cannot be measured in a timely fashion).
## Blood Component Modification

Modification of blood components by irradiation and leukocyte filtration or selection by CMV seronegativity may alter the efficacy of the component (leukocyte reduction by filtration may decrease platelet dose by as much as 10-20%) and are costly. When ordering these attributes the following recommendations should be considered:

<table>
<thead>
<tr>
<th>CMV Neg.</th>
<th>Gamma Irradiation</th>
<th>Leukocyte Reduced</th>
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</thead>
<tbody>
<tr>
<td>BM/Stem Cell Transplant Candidates</td>
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<tr>
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<td>√</td>
<td>Candidates for heart and kidney transplant</td>
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<tr>
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<td>√</td>
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<tr>
<td>Any Lymphoproliferative Malignancy</td>
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1. For patients with negative or unknown CMV serology.
2. All directed donations from family members require gamma irradiation.
3. Leukocyte reduced blood is recommended for patients who will undergo multiple cycles of chemotherapy that will require platelet transfusion support only if HLA antibody screening is negative.
4. Leukocyte depletion may be used if CMV negative blood components are not available or if already ordered for another indication.
5. If uncontrolled by leukocyte depletion, volume depletion of platelets prior to transfusion may decrease febrile reactions.

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