VANDERBILT UNIVERSITY
MEDICAL CENTER
DIVISION OF TRAUMA & SURGICAL CRITICAL CARE

Anemia Practice Management Guidelines

Anemia is a common clinical problem seen in critically ill trauma patients for a variety of reasons including bleeding, phlebotomy, decreased red blood cell production, premature destruction, and sequestration. As many as 85% of patients in the United States who have an ICU length of stay greater than one week receive at least one blood transfusion during their stay and 14% of ICU patients are transfused daily. Of patients receiving blood transfusions, only one third of the transfusions were associated with acute blood loss. Blood transfusions are associated with increased infection rates, increased risk of organ failure, increased length of stay in the ICU, and increased mortality. Finally, with the exception of patients with acute myocardial infarction, the literature has not identified a population of patients (including traumatic brain injury) that benefit from transfusion thresholds higher than that of the general ICU population.

1. Purpose
    a. Blood transfusions in and of themselves are not benign interventions and have the potential to cause serious morbid, and potentially fatal events. With this in mind, the anemia practice management guideline for the division of trauma has been established to provide target hemoglobin levels based on best available evidence in the trauma and critical care literature, designated appropriate transfusion triggers, and ensure that transfusion practices for the trauma population are conducted in a consistent manner.
2. Interventions
    a. Ensure normovolemia
    b. identify reasons for anemia
        i. bleeding
        ii. phlebotomy
        iii. chronic disease
        iv. inflammatory response
        v. impaired erythropoietin response
        vi. nutritional deficiency
        vii. hemodilution
    c. assess hemodynamic stability and signs of adequate organ perfusion
        i. normal vital signs
        ii. adequate urine output
        iii. normal mental status/level of consciousness
        iv. adequate skin perfusion
        v. normalized invasive hemodynamic parameters
    d. verify normal coagulation profile
    e. transfusion thresholds for trauma patients with active ischemic heart disease or acute ischemic syndromes is hemoglobin <10 g/dL, hematocrit <30
        i. particularly in unstable angina and active myocardial infarction or ischemia
    f. transfusion threshold for stable critical care patients based on the above parameters is hemoglobin <7 g/dL, hematocrit <21 unless they exhibit the following
        i. impaired oxygen delivery
        ii. shock
        iii. ongoing blood loss
    g. transfusion of patients with hematocrit 21-30 mandate an attending discussion
    h. wait 3 hours after transfusion before redrawing labs unless patient clinically unstable or ongoing blood loss

i. monitor transfused patient: 20% of patients receiving blood transfusion exhibit adverse reaction
j. if patient is anemic with chronic renal failure, consider erythropoietin therapy and iron as alternatives to increase blood cell mass
k. when patient is able, add iron supplementation in conjunction with bowel regimen
l. minimize blood loss by decreasing phlebotomy frequency
    i. change labs to p.r.n.
    ii. minimize frequency of labs for subacute patients
    iii. serial labs are unnecessary for monitoring solid organ injury
m. optimize nutrition
n. monitor continuously for signs of hypoperfusion with anemia
    i. follow neurologic and mental status, vital signs, end organ perfusion
    ii. invasive monitoring indicated by physiology and comorbidities, not by anemia
o. consider use of iron supplementation concomitantly with bowel regimen
    i. iron sulfate 325 mg PO TID
    ii. colace 100 mg PO TID or other added bowel regimen agents

3. Bloodless Medicine Patients
    a. Bloodless Medicine Patients usually will not accept whole blood or blood components
        a. Some may accept blood subfractions (immunoglobulins, albumin, coagulating factor concentrates)
    b. Reduce blood loss
        a. Mean daily phlebotomy losses in medical-surgical ICUs of ~41 mL/day
        b. Consider decreased testing, small volume sampling, point of care microtesting
        c. Minimize use of antiplatelet agents
    c. Erythropoiesis-stimulating agents (ESAs)
        a. Acceptable for most Jehovah Witness patients
        b. Onset of action 4-6 days
        c. Literature is conflicted regarding ideal dose
            i. Post-operative
                1. Hb <7: 300 units/kg (max 30,000 units) IV daily for 7 days. After 7 days, start subcutaneous therapy and taper down dose when Hb increases.
                2. Hb 7-9: 150 units/kg (max 15,000 units) subcutaneous every other day until discharge or hemoglobin of 11.
                3. Stop once Hb is greater than 10 g/dL
    d. Iron
        a. If ferritin <200 mg/dL → Iron supplementation
        b. Oral iron sulfate 325 mg PO TID
        c. IV iron
            i. Consider in cases of ongoing blood loss, physiologic or anatomic abnormality that interferes with oral absorption or iron homeostasis, and intolerable gastrointestinal side effects of oral iron.
    e. Folate and B12
        a. If MCV >95 fL, check folate and B12 levels and replace if needed.

Revised 2016, Oliver Gunter, M.D., Andrew Hopper, M.D.