VANDERBILT UNIVERSITY
MEDICAL CENTER
DIVISION OF ACUTE CARE SURGERY

Whole Blood Transfusion Protocol

Background: Early resuscitation with blood products has been extensively shown to improve clinical outcomes of traumatically injured patients with hemorrhagic shock and/or large volume bleeding. Balanced component transfusion in a 1:1:1 ratio approximating whole blood transfusion has been demonstrated to be superior to unbalanced component transfusion. Whole blood (WB) transfusion has become more available recently and evidence has shown improved clinical outcomes with WB transfusion over component therapy. This document provides guidelines for utilization of the Whole Blood transfusion at VUMC.

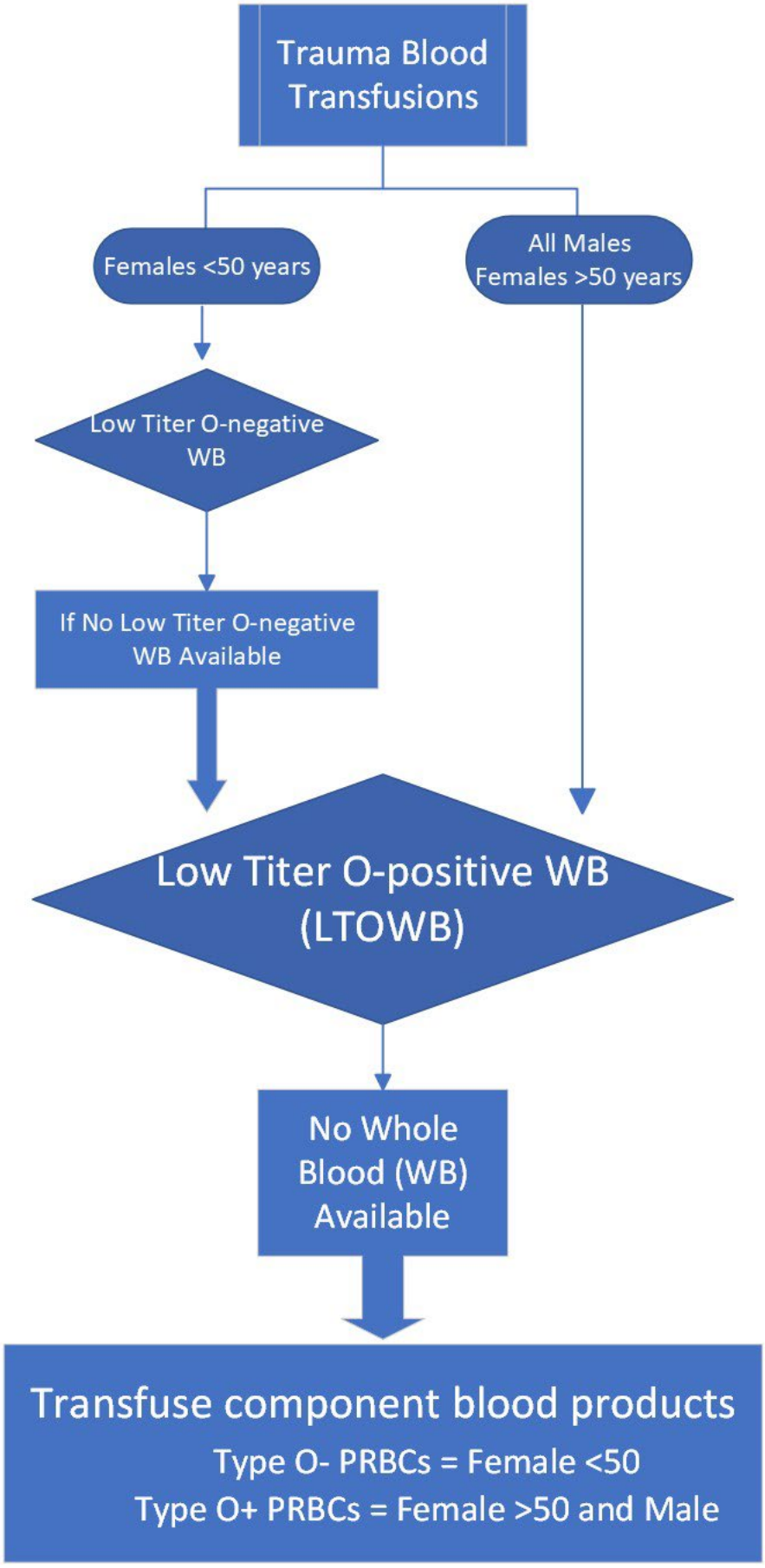
1. Patient selection
    a. Traumatically injured Patients with Systolic Blood Pressure <85 undergoing resuscitation in the Emergency Department.
    b. Traumatically injured Patients with ≥ 2 points on the ABC score.

2. WB Administration
    a. Male patients and female patients age >50 will receive low-titer O-positive whole blood (LTOWB).
    b. Female patients who are age <50 or currently pregnant will receive low-titer O-negative whole blood, if it is available (which is limited). If low-titer O-negative whole blood is NOT available, these patients will receive low-titer O-positive whole blood (LTOWB).
    c. If no WB is available, transfusion with Type O positive or Type O negative packed red blood cells should occur per standard protocol.
    d. Transfusion of 1 unit of WB is equivalent to transfusion with 1 unit PRBCS + 1 unit liquid plasma.
    e. Consideration for Massive Transfusion Protocol (MTP) should occur if a patient requires ongoing resuscitation after receiving 2 units of LTOWB in VUMC Emergency Department.
    f. If LTOWB is transfused to a woman of Rh-negative blood type who is <50 years of age, the trauma team will:
        i. Consult Transfusion Medicine within 24h to determine need for RhIg
            • Can also page Transfusion Medicine Resident at 615-835-9743 with questions
        ii. Order Follow up Type & Screen at 3 months to evaluate for anti-D antibodies
        iii. Outpatient referral maternal-fetal-medicine will be made for women with anti-D alloimmunization (presence of anti-D antibodies) on 3-month Type & Screen. For females <21 year of age, refer directly to Dr. Jennifer Andrews (Murdock) in Pediatric Hematology/Oncology
        iv. Use Epic Order set WB Rh Incompatibility

3. Availability of Whole Blood in ED
    a. 20 units of LTOWB per week will be available in the Emergency Release Blood Refrigerator in ED.
    b. If LTOWB is NOT available, transfusion with 1 unit PRBCS + 1 unit liquid plasma should be substituted.
    c. 8 units of Liquid Type A Plasma per week will be available in the Emergency Release Blood Refrigerator.
    d. 8 units of Type O positive and 6 units of Type O negative packed red blood cells (PRBCS) per week will be available in the Emergency Release Blood Refrigerator.
    e. Restocking of Emergency Release Blood Products supply will occur weekly, typically on Thursdays.

4. Documentation
    a. Transfusion Administration Record (TAR) must be completed per VUMC SOP.

5. Endpoints
    a. Patient can receive a <u>maximum</u> of 2 units of WB in the ED, after which transfusions should be transitioned to component therapy.


Trauma Blood Transfusions
Females <50 years
All Males
Females >50 years
Low Titer O-negative WB
If No Low Titer O-negative WB Available
Low Titer O-positive WB (LTOWB)
No Whole Blood (WB) Available
Transfuse component blood products
Type O- PRBCs = Female <50
Type O+ PRBCs = Female >50 and Male

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References:

1. Callcut RA, Cotton BA, Muskat P, et al. Defining when to initiate massive transfusion: a validation study of individual massive transfusion triggers in PROMMTT patients. *J Trauma Acute Care Surg.* Jan 2013;74(1):59-65, 67-58; discussion 66-57. (Prospectively validated all ABC predictors except penetrating mechanism)

2. Clements TW, Van Gent JM, Menon N, Roberts A, Sherwood M, Osborn L, Hartwell B, Refuerzo J, Bai Y, Cotton BA. Use of Low-Titer O-Positive Whole Blood in Female Trauma Patients: A Literature Review, Qualitative Multidisciplinary Analysis of Risk/Benefit, and Guidelines for Its Use as a Universal Product in Hemorrhagic Shock. J Am Coll Surg. 2023 Nov 6. doi: 10.1097/XCS.0000000000000906. Epub ahead of print. PMID: 37930900.

3. Nunez TC, Voskresensky IV, Dossett LA, Shinall R, Dutton WD, Cotton BA. Early prediction of massive transfusion in trauma: simple as ABC (assessment of blood consumption)? *J Trauma.* Feb 2009;66(2):346-352.
(Simple scoring system using non-lab variables. Score of 2 or greater was 75% sensisitve and 86% specific for MT)

4. van der Horst RA, Rijnhout TWH, Noorman F, Borger van der Burg BLS, van Waes OJF, Verhofstad MHJ, Hoencamp R. Whole blood transfusion in the treatment of acute hemorrhage, a systematic review and meta-analysis. J Trauma Acute Care Surg. 2023 May 1. doi: 10.1097/TA.0000000000004000. Epub ahead of print. PMID: 37125904.

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