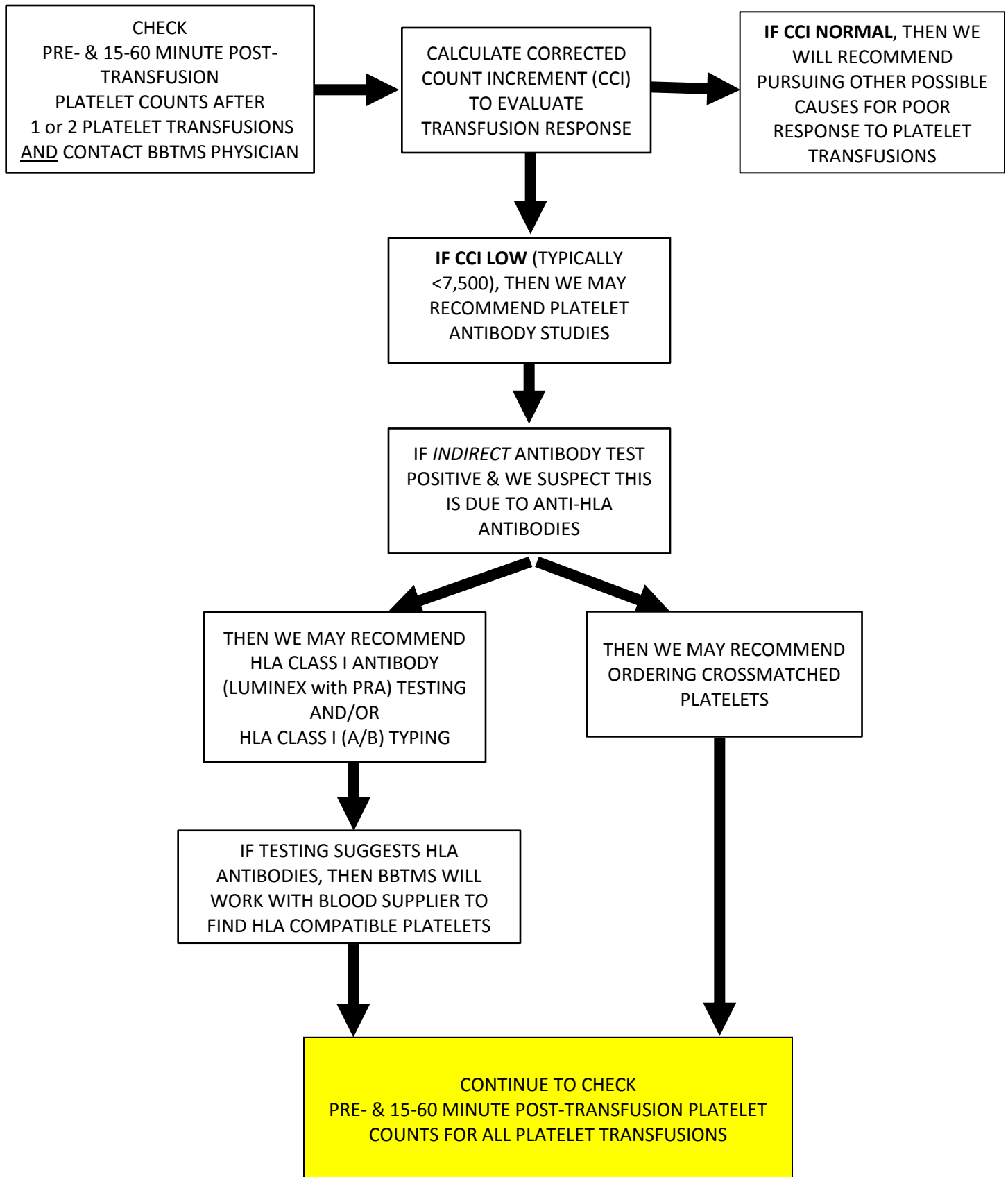


SUSPECTED PLATELET TRANSFUSION REFRACTORINESS



Please contact a BBTMS physician at PIC 1426 or 924-2273 for a consultation ([BBTMS Website](#))

Evaluating a Patient for Platelet Transfusion Refractoriness

1. Check platelet counts immediately prior to transfusion and within 15-60 minutes post-transfusion.
2. Call the BBTMS for a consultation:
 - a. Calculate transfusion response with Corrected Count Increment (CCI) as described in the Platelets Information document on the [BBTMS Website](#)
 - b. Discuss with BBTMS physician other options to improve platelet transfusion response such as ABO-matched and if available pooled, whole blood derived Platelets.
3. Evaluate other potential causes for poor increments such as fever, splenomegaly, liver disease, bleeding, sepsis, DIC etc. See etiologies of platelet refractoriness below.
4. In consultation with BBTMS physician determine whether additional testing is indicated.
5. Guiding the clinician for BBTMS Platelet Antibody ordering.
 - a. In Epic, go to the ordering screen type in "Platelet Antibody," then be sure you are in the "Facility List". Three options should appear, determine whether both direct and indirect platelet antibody testing are needed or if only one of the two tests is needed. Then order accordingly.
 - i. Both Direct and Indirect Platelet Antibody Test
 - Order, "Platelet Antibody Eval, Direct and Indirect" or use code LAB1853
 - [Note: requires 1-2 ACD yellow top tubes with ≥ 10 mL/tube. Two (2) tubes if platelet count < 50 k/uL.]
 - ii. Only the Direct Platelet Antibody Test
 - Order, "Platelet Antibody, Direct" or use code LAB1854
 - [Note: requires 1-2 ACD yellow top tubes with ≥ 10 mL/tube. Two (2) tubes if platelet count < 50 k/uL.]
 - iii. Only the Indirect Platelet Antibody Test
 - Order, "Platelet Antibody, Indirect" or use code LAB1855
 - [Note: requires 1 EDTA or ACD tube with ≥ 10 mL/tube]
 - b. Turn-around time: typically next day results if the sample reaches the BBTMS by 12p
6. The results of the Direct/Indirect Platelet Antibody Studies will help guide our recommendations for additional studies such as (a) ordering crossmatched platelets or (b) ordering additional studies such as Percentage Panel Reactive Antibodies (PRA) assays and/or HLA Class I typing as described here:
 - a. For crossmatched platelets order, "Platelet crossmatch, single donor"
 - i. If crossmatched units are used, then it is critical to obtain pre- and 15-60 minute post-transfusion platelet counts to evaluate the patient's response.
 - ii. This allows the BBTMS to work with the blood supplier and the clinical team to plan for future platelet transfusions.
 - b. Guiding the Clinician for HLA Typing and Panel Reactive Antibody Assay Ordering
 - i. In Epic, go to the ordering screen type in "HLA Class." Then be sure you are in the "Facility List". Several options should appear order the following two tests:
 - "HLA Typing (CLASS I TYPING BY SEROLOGY)" or use code LAB1274
 - ✓ For "Organ Type" choose N/A
 - ✓ Under "Comments" type in the following: "For platelet refractoriness"
 - ✓ [Note: requires 3 ACD, yellow top tubes with ≥ 10 mL/tube]
 - "Luminex S A Class I Pre Txp (HLA CLASS I ANTIBODIES) " or use code LAB3621

UVAHS Blood Bank & Transfusion Medicine Services (BBTMS)

Evaluating for Platelet Transfusion Refractoriness

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- ✓ For "Organ Type" choose N/A
 - ✓ Under "Comments" type in the following: "For platelet refractoriness"
 - ✓ [Note: requires 1 red top tube with $\geq 10\text{mL}$]
- ii. Send samples to Central Receiving marked "ATTN: HLA Lab"
 - iii. Turn-around time (M-F): same day results if samples reach the HLA lab before 12p.
 - iv. The BBTMS reviews these results and works with the blood supplier and the clinical team to plan for future platelet transfusions.

Etiologies of Platelet Refractoriness

Major Incompatibility:

- O patient + A platelets
 - A patient + B platelets
 - O patient + B platelets
 - B patient + A platelet
1. Patient's anti-A + Donor A Ag on platelets \rightarrow platelet destruction
 2. Destruction dependent on:
 - a. Patient's Anti-A: strength, titer and IgG and/or IgM (worse due to complement activation)
 - b. Donor's A Ag: concentration on platelets and free soluble antigen in plasma
 3. Typically major incompatibility is worse than minor incompatibility

Minor Incompatibility:

- A patient + O platelets
 - A patient + B platelets
 - B patient + O platelets
 - B patient + A platelet
 - AB patient + O platelets, A platelets or B platelets
1. Donor anti-A + Patient's A Ag on platelets \rightarrow Patient's A platelets destroyed
 2. Donor O platelets + Patient's soluble A Ag \rightarrow soluble A Ag binds to Donor O platelets to form Donor "A" platelets \rightarrow Donor "A" platelet + Donor's Anti-A \rightarrow Donor "A" platelets destroyed
 3. Donor anti-A + Patient's soluble A Ag \rightarrow Immune complex (IC) \rightarrow anti-A of IC binds to A Ag on both donor "A" platelets and patient's A platelets or IC nonspecific binding to platelets \rightarrow Anti-A of Immune complex binds Fc of macrophage or if enough IgGs present could activate C' \rightarrow destroys both Patient's A platelets and Donor "A" platelets

References to learn more:

Heal JM, et al: An evaluation of crossmatching, HLA, and ABO matching for platelet transfusions to refractory patients. *Blood* 1987 ;70(1):23-30.
Shanwell A, et, al. Post-transfusion mortality among recipients of ABO-compatible but non-identical plasma. *Vox Sang* 2009;96:316-323.

Immune Mediated Refractoriness

1. anti-HLA
2. anti-HPA
3. anti-A, anti-B, anti-A,B
4. Drug Dependent Platelet Antibodies (DDPAs) also known as Drug Induced Immune Thrombocytopenia:^{*}
 - a. Heparin (HIT)
 - b. Vancomycin
5. Post-transfusion purpura[†]

NonImmune Mediated Refractoriness

1. DIC
2. TTP
3. Fever and sepsis
4. Bleeding
5. Amphotericin
6. Splenomegaly
7. HPC transplant

^{*}Reference to learn more: Reese JA, et al. Identifying drugs that cause acute thrombocytopenia: an analysis using 3 distinct methods. *Blood* 2010;116(12):2127-2133.

[†]Rare form of immune thrombocytopenia caused by antiplatelet alloantibodies, typically anti-HPA 1a (aka PLA1), directed against platelet glycoprotein found in transfused blood products (most commonly RBCs); clinical characteristics include purpura and rapid onset of severe thrombocytopenia 2-14 days after transfusion