Navigating the Bermuda Triangle of Transfusion Medicine & the Oncology patient

Angela Treml, MD

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knowledge changing life

MEDICAL COLLEGE OF WISCONSIN

Objectives

- Review thresholds for transfusions
- Examine how certain medications interfere with blood bank testing
  - Discuss what incompatible or “least” incompatible crossmatch really means
- Indications for blood product modifications for the heme-onc patient

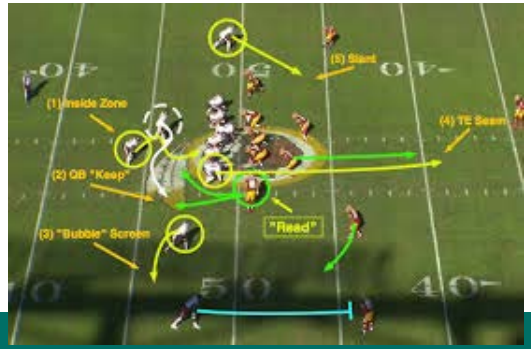
Navigating Thresholds

- Moved from Hgb threshold of 10 to 7
  - Based on numerous RCTs
    - TRICC, SEPTIC SHOCK etc
- Moved away from 2-unit RBC transfusions
- Platelet thresholds based on RCTs
  - Not much change over last 5 years
  - Prophylactic 10K
  - If on anticoagulation 50K
- 2016 AABB guidelines did not have a recommendation for Hematology-Oncology patients
  - BUT the 2023 do!

RBC Transfusions: 2023 AABB International Guidelines

- Expert multidisciplinary international panel
  - Collaboration and endorsement by numerous other professional societies and committees

- Good practice statement:
  - Look at the whole picture
    - Hemoglobin, signs, symptoms, rate of decline of hemoglobin, patient preferences and values, and clinical picture



Adult Recommendation #2 in 2023

- For hospitalized adult patients, the panel suggests a restrictive RBC transfusion strategy in which transfusion is considered when the hemoglobin concentration is less than 7 g/dL in those with hematologic and oncologic disorders (conditional recommendation, low certainty evidence).
- Seven RCTs in hematology-oncology
  - Lower enrollment numbers
- Despite this still no evidence of harm or increased bleeding

Carson JL, Stanworth SJ, Guyatt G, et al. Red Blood Cell Transfusion: 2023 AABB International Guidelines. *JAMA.* 2023;330(19):1892–1902. doi:10.1001/jama.2023.12914

How we in the blood bank navigate drug interferences

- Biggest (known) offenders
  - Monoclonal therapies
    - Anti-CD38
    - Anti-CD47
- Number one thing to remember
  - Send blood bank a sample before starting!!!!
    - Type and screen
    - DAT
    - Phenotype and/or Genotype

Anti-CD38 vs Anti-CD47

- Anti-CD38
  - Interferes with antibody screen
    - Everything becomes positive
  - Baseline testing is key
  - Blood bank techniques to remove the interference
    - In-house vs send out
  - Complete or Full Crossmatches will be incompatible

- Anti-CD47
  - Interferes with blood type, antibody screen, DAT, eluate
    - CD47 is a glycoprotein found on all cells including of course RBCs!
  - Baseline testing including genotype
  - No way around this interference!
    - Antibody screen may not be affected depending on blood bank reagents
  - Crossmatches may be incompatible

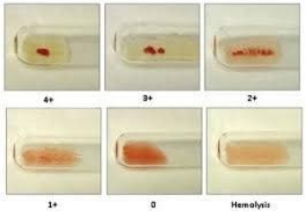
Once drug is stopped, interference will go away

Incompatible Crossmatch

- “Least” incompatible

Navigating the what this means and why??

- Incompatible crossmatch
  - With Anti-CD38 and Anti-CD47, it's the drug interfering
    - Vs an autoantibody or alloantibody
  - See agglutination when mixing plasma and RBCs



  - How your transfusion service handles this may be different than the one down the street.
  - Take home message: PLEASE send testing prior to starting these drugs!!!

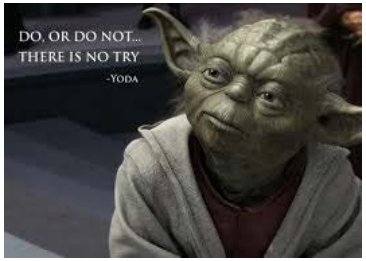
Blood product Modifications

- Leukoreduction
- Irradiation
  - Pathogen Reduced Platelets
- Volume Reduction
- Washed

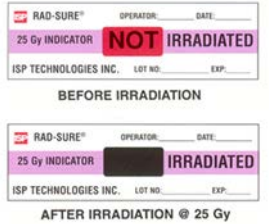
Leukoreduction

- For whole blood or RBCs
  - Run through a filter pre-storage
- Apheresis RBCs or platelets
  - Occurs at time of collection

- Considered CMV safe and equivalent to a CMV negative product
  - All RBCs and Platelets here in WI are leukoreduced



Why do we irradiate?



- Prevention of transfusion associated graft-vs-host disease (TA-GVHD)
  - Only reason for irradiation
- Caused by transfused T-lymphocytes
  - The transfused t-lymphocytes look around, see foreign HLA antigens, and recognize, this isn't me.
  - As a result, they begin to do what T-lymphocytes do, which is to recruit other T-lymphocytes to mount a cellular immune response against the host tissues

Who should get irradiated RBCs and Platelets?

- Most will agree on the following:
  - Intrauterine transfusion
  - Hematologic malignancies
  - Stem cell transplant recipients
  - HLA-matched/directed donor units
  - Congenital T-cell immune deficiency

Irradiator

- Cesium or X-ray
- Takes about 3-5 minutes
- Only need to irradiate cellular products
  - RBC, apheresis platelet

Pathogen reduction platelets

- Treated with psoralen and UV light
- Inactivates any bacteria, virus, T-cells, parasites
- PRT platelet does not need to be irradiated
- Shelf life is 5 days

Volume Reduction

- Removes 2/3 of the plasma from a platelet
  - ~300 ml to ~100 ml product
  - Takes ~30 minutes
  - Platelet expires in 4 hours
  - Lose 15% of the platelets so not as good of a bump!
- Main reason to do is moderate allergic reactions
  - Volume overload is not a good reason

Washing RBCs and Platelets

- Remove ~99% of the plasma in the product
- Indications
  - Severe allergic reactions
  - Severe IgA deficiency
- Often done at the blood supplier
  - Takes several hours to get the unit
- Shorter shelf life
- Smaller product with smaller increment in counts

Thanks for your time and attention!