All Mixed Up In The Blood Bank

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The University of Kansas Hospital
Clinical Presentation
- 74 y/o female with a history of AML presented to the Cancer Center complaining of extreme fatigue

History
- 1st MUD transplant 6/25/14
  - Donor was O positive w/ recipient as A neg
  - Unsuccessful
  - Graft failure
- 2nd MUD transplant 12/11/14
  - Same donor
  - BM biopsy with chimerism scheduled for 3/6/15 to check cellularity
Patient Presentation
3/03/15

- Labs
  - WBC 2.5 K/uL
  - Hgb 6.8 g/dL
  - Hct 19.7 %
  - Plt 25 K/uL

- Blood Bank
  - Received order to transfuse 1 unit
    - Indication <7.1 g/dL
  - Specimen drawn
# Blood Bank Serology

## Patient

### Antibody Detection

<table>
<thead>
<tr>
<th>Cell</th>
<th>Echo</th>
<th>Neo</th>
<th>Gel</th>
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<td>AC</td>
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### ABO/RH Interpretation

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<tr>
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<th>Anti-B</th>
<th>Anti-A,B</th>
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### Antibody Identification

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### Direct Antiglobulin

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<tr>
<th>Poly</th>
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<th>C3</th>
<th>Saline</th>
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### Other Cell Typings

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### Diagnosis

- Antibody Registry: FND  ✓ anti-K  NFND  □  Entered □

### Transfusion Hx/Medications

- Previously ID’d anti-K at TUKH 2/22/15

### Report

- SENT TO CBC

### Additional Billing

- AABI  AGIS  Other

### Date

- 3/3/2015
What Do We Know?

- Patient has a history of a cold autoantibody and anti-K previously ID’d 2/22/15
- Patient is much more reactive
  - Reactive in all phases of testing, all methods, all temps
  - Now has a positive DAT
- Patient now has a warm autoantibody in addition to the cold autoantibody
  - Eluate reactive with all cells tested
- Did she develop additional alloantibodies?
  - Our prewarmed technique didn’t circumvent the reactivity
- Is the cold autoantibody clinically significant?
  - 2+ complement on cells, hemolysis?
Off to Immuno at CBC!!!
CBC Consultation

- ABORh could not be determined based upon TUKH’s history
  - Donor is O positive/patient is A negative
  - Receiving O negative red cells during conversion

- Positive DAT
  - Required multiple warm washing
  - Red cells were coated with anti-IgG and complement

- Eluate
  - Warm autoantibody
Plasma
- Cold autoantibody
  - Reactivity circumvented with prewarmed technique
- Anti–K with no additional alloantibodies

Cold Autoantibody Investigation
- 2+ complement on cells
- Patient was hemolyzing
- Was the cold autoantibody clinically significant?
- Could this be a Mixed–Type AIHA??
“Mixed-Type” refers to a condition of “combined warm and cold” autoantibodies

- Warm reactive IgG autoantibody in eluate and plasma
- Cold reactive IgM autoantibody present in plasma showing broad thermal range
  - Reacts strongly at lower temps but also at or above 30°C
  - Normal antibody titers at 4°C (<64)
  - Often has no apparent specificity

Complex reactivity in all phases of testing
Used to assess the clinical significance of autoantibodies

Autoantibodies with a wide thermal range have the potential to cause significant immune hemolysis

**Thermal Amplitude Studies**
- Specimen is collected, placed in a 37°C waterbath allowing the red cells to settle and the warmed plasma is separated
- Warmed plasma is tested with SC I, SCII, AC at 30°C and 37°C

**Titration Studies**
- Plasma is serially diluted with saline, tested with SC I and SCII at 4°C
CBC Consultation

- Thermal Amplitude Studies
  - Cold autoantibody demonstrated weak reactivity at 30C and 37C with autologous cells only

- Titration Studies
  - Cold autoantibody titered to 32 at 4C

- Conclusion
  - Results are equivocal in determining the clinical significance of the cold autoantibody

- Recommendation
  - Transfuse only if necessary!
Plan of Action

- Only transfuse if HGB drops below 5.0 g/dL
- Give K-negative red cells, least incompatible
- Split the units in half and transfuse slowly

Possible Future Problems
- Ref Lab’s cell separation was unsuccessful
  - Poor retic counts due to BMT diagnosis and treatment
- Unable to phenotype or send off for DNA analysis
  - Donor/recipient mismatch
  - Would the phenotype/genotype be donor or recipient?
- Piece of info would be invaluable for future transfusions
  - Possible antigen matching of units
Patient Outcome

- Patient medicated to control the autoantibodies
  - Predisone
  - Solu-Medrol
  - Rituxan
- Patient received 5 units of RBCs between 4/6–5/26/15
  - Split units
  - Rec’d as an outpatient
- Last HGB check was 5.6 g/dL
- Admitted to Hospice 5/26/15
Questions??
Sources

- AABB Technical Manual, 18th Ed, 2014