

# All Mixed Up In The Blood Bank

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# Patient Presentation

3/03/15

## ▶ Clinical Presentation

- 74 y/o female with a history of AML presented to the Cancer Center complaining of extreme fatigue

## ▶ History

- 1<sup>st</sup> MUD transplant 6/25/14
  - Donor was O positive w/ recipient as A neg
  - Unsuccessful
  - Graft failure
- 2<sup>nd</sup> 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

ABO/RH	Cell Typing							Reverse Typing		
Interpretation	Phase	Anti-A	Anti-B	Anti-A,B	Anti-D	Anti-D	Mono Cont	A1 Cells	B Cells	A2 Cells
O neg	IS	0	0		0			2+	4+	

Antibody Detection				
Cell	Echo	Neo	Gel	
I	4+		4+	
II	4+		4+	
III	4+			
AC			4+	

Direct Antiglobulin			
Poly	IgG	C3	Saline
2+	2+	2+	0

Other Cell Typings					
Anti-	Anti-	Anti-	Anti-	Anti-	Anti-
Phenotype:					

## Antibody Identification

Ortho	Phase				Immucor	Phase			Immucor	Phase			Immucor	Phase			
Lot # VRA218	GEL-ELUATE				Lot # 02904	5'RT	LISS 37	LISS IAT	Lot # 03912	5'RT	sal repl	30' 4 C	Lot # 03912	PW IAT			
1	4+				1	2+	2+	2+	I	1+	1+	3+	I	1+			
2	4+				4	3+	3+	3+	II	1+	1+	3+	II	1+			
3	4+				6	2+	2+	2+	AC	1+	1+	3+	AC	1+			
4	4+				8	2+	2+	2+									
5	4+				10	2+	2+	2+									
6	4+				12	3+	2+	3+									
7	4+				13	2+	2+	2+									
8	4+				17	3+	2+	3+									
9	4+				AC	3+	3+	3+									
10	4+																
11	4+																

Diagnosis \_\_\_\_\_ Antibody Registry: FND  anti-K \_\_\_\_\_ NFND  Entered   
 Transfusion Hx/Medicatio: Previously ID'd anti-K at TUKH 2/22/15  
 Report \_\_\_\_\_ SENT TO CBC \_\_\_\_\_ Tech \_\_\_\_\_  
 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

# CBC Consultation

## ▶ 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 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 30C
  - Normal antibody titers at 4C (<64)
  - Often has no apparent specificity
- ▶ Complex reactivity in all phases of testing

# CBC Consultation

## Thermal Amplitude and Titration Studies

- ▶ 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 37C waterbath allowing the red cells to settle and the warmed plasma is separated
  - Warmed plasma is tested with SC I, SCII, AC at 30C and 37C
- ▶ **Titration Studies**
  - Plasma is serially diluted with saline, tested with SCI and SCII at 4C

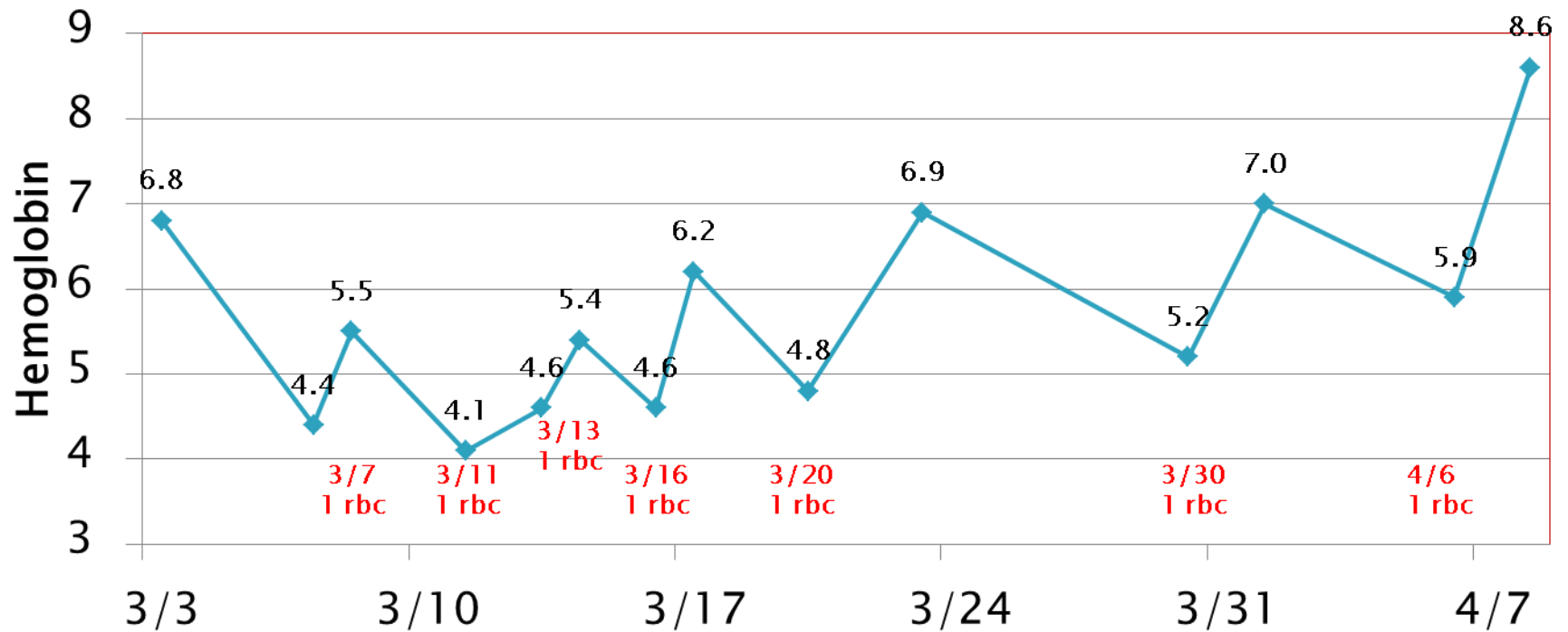
# CBC Consultation

- ▶ 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

# Transfusion Timeline



# 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, 18<sup>th</sup> Ed, 2014
- ▶ Judd's Methods in Immunohematology, 3<sup>rd</sup> Ed, 2008.