

RED URINE IN A RECENTLY TRANSFUSED WOMAN

Case Study by Jim Perkins, M.D. (© 2009)

A 49 year old African-American woman came to the emergency room with a complaint of red urine. She also noted fever and malaise for the previous 3 days. Nine days before admission she was evaluated at another hospital for dyspnea and chest pain, and was transfused 2 units of RBCs which ameliorated her symptoms.

Her past medical history included non-insulin dependent diabetes mellitus, hypertension, chronic renal insufficiency, and chronic anemia for which erythropoietin had recently been started. The patient had been transfused at the births of each of her children 31, 30 and 27 years earlier, and in the latter case she received multiple units because of placenta previa. There was no history of hemolytic disease of the newborn. Seven years earlier she underwent hysterectomy for uterine leiomyomas (fibroids) and received a transfusion of 3 units of RBCs complicated by urticaria.

On admission the patient had a temperature of 101.2. She did not appear icteric. Pertinent laboratory data included:

			Urinalysis			
Day	Hgb/Hct	BUN/Cr	color	bili	occ. bld	RBCs
-13	7.5/22.9	40/5.3				
-8	transfused 2 units RBCs					
Adm	9.4/27.6		brown	1+	3+	5-10
+1	7.7/23.1	52/6.9	yellow	0	2+	0-5
+2		56/7.1	yellow	0	3+	5-10
+3	7.2/21.3	61/7.4				
+4	6.9/20.3	58/7.5				
+5	6.8/20.8	55/7.4	yellow	0	3+	0-5
+6	7.1/21.0	53/6.9				
+7	7.3/21.9	48/6.7				

Other labs drawn on day +2 included:

LDH = 395

Total Bilirubin = 0.2/0.0

ESR = 146

Fe/TIBC = 43/126 (65-165/240-450)

Ferritin = 981 (10-200)

A "type-and-screen" was ordered with the following results:

ABO and Rh Typing

	Anti-		Test Cells		Anti-			Interp.	
	A	B	A1	B	D	Du	Cont	ABO	Rh
IS	0	0	4+	4+	4+			0	Pos

Antibody screen

	IS	30'37°	AHG	CC
OI	1+	1+	4+	
OII	1+	1+	4+	
OIII	1+	1+	4+	
Auto	0	0	0	2+

Initial Serum Panel: 4 drops serum, saline suspended RBCs

Lot: 0908		Rh						MNSs				P	Lewis		Lutheran		Kell				Duffy		Kidd			Special typings				
Cell	Rh	D	C	c	E	e	V	M	N	S	s	P1	Le ^a	Le ^b	Lu ^a	Lu ^b	K	k	Kp ^a	Js ^a	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Xg ^a		Cell	IS	37°	AHG
1	r'r	0	+	+	0	+	0	+	0	+	0	w	0	+	0	+	0	+	0	0	+	+	+	+	0		1	2+	3+	4+
2	R1wR1	+	+	0	0	+	0	0	+	0	+	+	+	0	+	+	0	+	0	0	+	+	+	+	+	C ^w	2	2+	3+	4+
3	RzR1	+	+	0	+	+	0	+	+	0	+	+	0	+	0	+	0	+	0	0	+	0	+	+	+		3	2+	3+	4+
4	R2R2	+	0	+	+	0	0	+	0	+	0	+	+	0	0	+	+	+	0	0	+	+	+	+	+		4	2+	3+	4+
5	Ror	+	0	+	0	+	0	0	+	0	+	+	0	+	0	+	0	+	0	0	0	0	+	0	+	Go(a+)	5	2+	3+	4+
6	r''r	0	0	+	+	+	0	+	0	0	+	+	0	+	0	+	0	+	0	0	0	+	+	+	+		6	2+	3+	4+
7	rr	0	0	+	0	+	0	0	+	0	+	+	+	0	0	+	+	+	0	0	0	+	+	+	+		7	2+	3+	4+
8	rr	0	0	+	0	+	0	0	+	+	+	+	0	0	0	+	0	+	0	0	+	0	+	0	+		8	2+	3+	4+
9	rr	0	0	+	0	+	0	0	+	0	+	0	+	0	+	+	0	+	0	0	+	0	+	+	+		9	2+	3+	4+
10	rr	0	0	+	0	+	+	0	+	0	+	+	0	+	0	+	0	+	0	0	+	+	0	+	+		10	2+	3+	4+
11	R1R1	+	+	0	0	+	0	0	+	+	+	+	0	0	+	0	0	+	0	0	0	+	+	0	+		11	2+	3+	4+
Patient																										AC				

Second panel: 4 drops raw serum, saline suspended RBCs

Lot #92427		Rh system						Kell						Duffy		Kidd		Lewis		P	MNSs				Lutheran		Xg	Other Typings	4 drops serum, IAT			
Cell	Rh	D	C	c	E	e	V	K	k	Kp ^a	Kp ^b	Js ^a	Js ^b	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	P1	M	N	S	s	Lu ^a	Lu ^b	Xg ^a		Cell	RT	37°	>IgG
1	rr	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	+	0	0	+	0	+	0	+	0	+	+	1	1+	1+	4+	
2	rr	0	0	+	0	+	0	0	+	0	+	0	+	+	0	+	+	+	0	+	+	0	+	+	0	+	+	2	1+	1+	4+	
3	rr	0	0	+	0	+	0	0	+	0	+	0	+	0	0	+	+	+	0	+	0	+	0	+	0	+	+	3	1+	1+	4+	
4	r'r	0	+	+	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	+	+	0	+	0	+	+	4	vw+	1+	4+	
5	r''r	0	0	+	+	+	0	0	+	0	+	0	+	+	+	+	0	0	+	0	+	0	+	0	0	+	+	5	1+	2+	4+	
6	R1wR1	+	+	0	0	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	+	0	0	+	+	6	1+	2+	4+	
7	Ro	+	0	+	0	+	0	0	+	0	+	+	0	0	0	+	0	0	+	+	0	+	0	+	0	+	+	7	1+	2+	4+	
8	R2R2	+	0	+	+	0	0	0	+	0	+	0	+	+	+	+	+	+	0	0	+	+	0	+	0	+	0	8	1+	2+	4+	
9	RzR1	+	+	0	+	+	0	0	+	0	+	0	+	+	+	+	+	0	+	+	+	0	+	0	0	+	+	9	1+	2+	4+	
10	R2R2	+	0	+	+	0	0	0	+	0	+	+	+	0	0	+	+	0	0	+	+	+	0	+	0	+	+	10				
11	R1R1	+	+	0	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	0	+	0	+	+	+	0	11				
12	rr	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	+	0	+	0	+	+	12				
13	rr	0	0	+	0	+	0	+	+	0	+	0	+	+	0	+	0	0	+	+	+	0	+	0	0	+	+	13				
14	rr	0	0	+	0	+	0	0	+	+	+	0	+	0	+	+	+	0	+	0	+	+	+	+	0	+	+	14				
15	R1r	+	+	+	0	+	0	+	0	0	+	0	+	+	+	0	+	0	+	+	+	+	0	+	0	+	+	15	0	1+	4+	
16	R1R1	+	+	0	0	+	0	0	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	+	0	+	+	Yk(a-),Kn(a-),McC(a-)	16			
Patient																												AC	0	0	0 ^v	

Discussion Questions:

1. What diagnosis is suggested by this sequence of events and the patient's laboratory data? What information would help make this diagnosis?
2. What type of antibody(ies) might be present when the patient's serum reacts with all allogeneic RBCs tested? Does the patient's ethnicity suggest any possibilities for the identity of the antibody(ies)?

Additional testing was performed in order to identify the antibody(ies).

Blood group phenotype

ANTI-	C	E	c	e	M	N	S	s	P1	Le ^a	Le ^b	K	Fy ^a	Fy ^b	Jk ^a	Jk ^b
Patient	0	3+	4+	2+	4+	0	0	0	2+	0	3+	0	0	0	3+	0
Pos. Cntrl.	4+	3+	4+	2+	4+	2+	3+	3+	3+	2+	3+	3+	3+	3+	3+	3+
Neg Cntrl.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Selected cell panel

Lot:		Rh						MNSs				P	Lewis		Lutheran		Kell				Duffy		Kidd			Special typings	4 drops serum/saline				Ficin tx'd RBCs			
Cell	Rh	D	C	E	c	e	V	M	N	S	s	P1	Le ^a	Le ^b	Lu ^a	Lu ^b	K	k	Kp ^a	Js ^a	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Xg ^a		IS	37°	AHG*	>IgG	IS	37°	AHG*	
1	rr	0	0	0	+	+	0	+	0	+	+	0	+	0	0	+	0	+	0	0	0	+	+	+	+			2+	4+					
2	r'r'	0	+	0	0	+	0	+	+	0	0	+	0	0	0	+	0	+	0	0	0	0	+	+	+			0	0					
Cells from frozen rare cell inventory																																		
3	r'r	0	+	0	+	+	0	+	+	0	0	+	0	+	0	+	0	+	0	0	0	0	+	+	0	U-	0	0	vw+	0 [√]	0	0	0 [√]	
4	rr	0	0	0	+	+		0	+	0	0	+	0	+			0	+			0	0	+	0		U-	0	0	0 [√]	0 [√]	0	0	0 [√]	
5	rr	0	0	0	+	+		0	+	0	0		0	0			0				0	0	+	+		U-	0	0	vw+	0 [√]	0	0	1+	
6	R2r	+	0	+	+	+		0	+	0	0	+	0	+			0	+	0	0	0	0	+			U-	0	0	vw+	0 [√]	0	0	0 [√]	
7	Ro	+	0	0	+	+				0	0						0				0	+	+	+		U-	0	0	vw+	0 [√]	0	0	0 [√]	
8	R2R2	+	0	+	+	0		+	+	0	0	+					0				+	0	+	0		U-	0	0	3+	2+	0	0	2+	
Patient																																0	0	0 [√]

*Polyspecific AHG

Discussion Question:

3. What antibody(ies) do you think might be present based on this new information?

Additional testing:

4x allo-adsorbed serum: Adsorbing cell A pos, Fy^a-, Jk^b-, K-, S-, s+

		Rh system						Kell						Duffy		Kidd		Lewis		P	MNSs				Lutheran		Xg	Other Typings			
Cell	Rh	D	C	c	E	e	V	K	k	Kp ^a	Kp ^b	Js ^a	Js ^b	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Le ^a	Le ^b	P1	M	N	S	s	Lu ^a	Lu ^b	Xg ^a		Cell	37°	>IgG
1	rr	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	+	0	0	+	0	+	0	+	0	+	+		1	0	3+
2	rr	0	0	+	0	+	0	0	+	0	+	0	+	+	0	+	+	+	0	+	+	0	+	+	0	+	+		2	0	3+
3	rr	0	0	+	0	+	0	0	+	0	+	0	+	0	0	+	+	+	0	+	0	+	0	+	0	+	+		3	0	2+
4	r'r	0	+	+	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	+	+	0	+	0	+	+		4	0	2+
5	r''r	0	0	+	+	+	0	0	+	0	+	0	+	+	+	+	0	0	+	0	+	0	+	0	0	+	+		5	0	3+
6	R1wR1	+	+	0	0	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	+	0	0	+	+		6	0	3+
7	Ro	+	0	+	0	+	0	0	+	0	+	+	0	0	0	+	0	0	+	+	0	+	0	+	0	+	+		7	0	vw+
8	R2R2	+	0	+	+	0	0	0	+	0	+	0	+	+	+	+	+	+	0	0	+	+	0	+	0	+	0		8	0	4+
9	RzR1	+	+	0	+	+	0	0	+	0	+	0	+	+	+	+	+	0	+	+	+	0	+	0	0	+	+		9	0	3+
10	R2R2	+	0	+	+	0	0	0	+	0	+	+	+	0	0	+	+	0	0	+	+	+	0	+	0	+	+		10	0	1+
11	rr	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	+	0	+	0	+	+		11	0	vw+
12	rr	0	0	+	0	+	0	+	+	0	+	0	+	+	0	+	0	0	+	+	+	0	+	0	0	+	+		12	0	4+

Discussion Question:

4. How do the results using alladsorbed serum help with the immunohematologic diagnosis?

Testing at an immunohematology reference lab with multiple U-negative RBC samples demonstrated anti-Fy^a and -Jk^b. Anti-K could not be ruled out.