

A PATIENT WITH A HIGH RETICULOCYTE COUNT

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

PATIENT HISTORY

K.K., a 33 year old man, visited his physician complaining of fatigue and dyspnea. Laboratory tests were ordered and he was sent him home. When the results were reported the following day demonstrating severe anemia (hemoglobin/hematocrit = 4.7/12.8), the office called and told him to go to the emergency room.

In the emergency room he provided a history of progressive fatigue over 3 to 4 months to the point that he was sleeping 14 to 16 hours a day. He also noted progressive dyspnea on exertion, recounting that he had to rest before completing his shower on the day of the visit. Nausea and vomiting were recently limiting his food intake, and he had lost 14 pounds. Finally, he complained of diffuse aching.

The patient's past history was remarkable for a rectal abscess which had been treated with IV antibiotics, but he denied transfusion. He also denied heart disease and had not traveled recently. Laboratory tests performed 9 months earlier revealed slight anemia (hgb/hct = 12.4/36) and hyperbilirubinemia (total bilirubin = 1.9).

On examination he appeared pale and jaundiced. He had tachycardia (PR = 116) but was afebrile (99.1) and normotensive (BP = 127/71). The rest of his examination was relatively normal.

The patient was admitted to the ICU. His laboratory test results included the following:

Hematologic results

Hemoglobin 4.0 g/dL
 Hematocrit 11.3 %
 MCV 119 (nml 80-94)
 WBC 6,100/mm³
 Platelets 186,000/mm³

Reticulocytes:

% 51.3
 Absolute # 487,000/m³

Chemistries:

Bilirubin, total 4.8 mg/dL (uln 1.4)
 , direct acting 0.5 mg/dL (uln 0.4)
 LDH 531 (uln 200)
 Haptoglobin <5.8 (nml 16-200)

U/A:

Color Yellow
 Blood Trace

ABO and Rh Typing

Anti-		Red Cells		Anti-			Interp
A	B	A1	B	D	Wk D	CCC	
0	0	3+	3+	4+			O Pos

AS: Gel

OI	3+
OII	3+

DAT

Poly	3+
IgG	3+
C3d	2+

Raw Serum Panel

Lot# 8RA137		Rh system					Kell					Duffy		Kidd		Xg	Lewis		MNSs				P	Lutheran		Other				
Cell	Rh	D	C	E	c	e	V	K	k	Kp ^a	Kp ^b	Js ^a	Js ^b	Fy ^a	Fy ^b	Jk ^a	Jk ^b	Xg ^a	Le ^a	Le ^b	S	s	M	N	P1	Lu ^a	Lu ^b	Typings	Cell	Gel
1	R1wR1	+	+	0	0	+	0	0	+	0	+	0	+	+	+	0	+	+	+	0	+	+	+	0	+	0	+	C ^w	1	3+
2	R1R1	+	+	0	0	+	0	+	0	+	0	+	+	+	+	+	+	+	0	+	+	+	+	+	0	0	+		2	3+
3	R2R2	+	0	+	+	0	0	0	+	0	+	0	+	+	0	+	+	+	0	+	0	+	+	+	0	0	+		3	3+
4	Ror	+	0	0	+	+	+	0	+	0	+	0	+	0	0	+	+	0	0	0	0	+	0	+	+	0	+		4	3+
5	r'r	0	+	0	+	+	0	+	+	0	+	0	+	+	+	+	0	+	+	0	+	0	0	+	+w	0	+		5	3+
6	r''r	0	0	+	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	+	+	+	+	0	0	+		6	3+
7	rr	0	0	0	+	+	0	+	+	0	+	0	+	0	+	0	+	+	0	+	+	+	+	0	+w	0	+		7	3+
8	rr	0	0	0	+	+	0	0	+	0	+	0	+	+	+	+	0	+	+	0	0	+	0	+	0	0	+		8	3+
9	rr	0	0	0	+	+	0	0	+	0	+	0	+	+	0	+	0	0	0	+	+	0	+	0	+w	0	+		9	3+
10	rr	0	0	0	+	+	0	0	+	0	+	0	+	0	+	+	+	+	0	0	+	+	+	0	0	0	+		10	3+
11	R1R1	+	+	0	0	+	0	+	+	0	+	0	+	0	+	+	0	+	0	+	0	+	0	+	+	0	+		11	3+
Patient																													AC	

Cold and Eluate Panels

Lot #51777		Rh system					Kell					Duffy		Kidd		Lewis		P	MNSs				Lutheran		Xg	Other	Raw Serum				Eluate			
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	Typings	Cell	IS	RT	14°	AHG	CC
1	R1R1	+	+	0	0	+	0	0	+	0	+	0	+	0	+	+	0	0	+	+	0	+	+	+	+	+	+		1	0	1+	3+	3+	
2	R1wR1	+	+	0	0	+	0	0	+	0	+	0	+	+	0	0	+	0	+	+	0	+	0	+	0	+	+		2	0	2+	3+	3+	
3	R2R2	+	0	+	+	0	0	0	+	0	+	0	+	0	+	+	+	0	+	0	+	+	0	+	0	+	+		3	0	1+	3+	3+	
4	Ror	+	0	+	0	+	0	0	+	0	+	+	+	0	0	+	+	w	+	+	+	0	0	0	0	+	+		4	0	2+	3+	3+	
5	r'r	0	+	+	0	+	0	0	+	0	+	0	+	+	0	+	+	0	+	0	+	0	+	+	0	+	+		5	0	2+	3+	3+	
6	r''r	0	0	+	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	+	0	+	0	+	+		6	0	3+	3+	3+	
7	rr	0	0	+	0	+	0	+	+	0	+	0	+	0	+	+	+	0	+	0	+	0	0	+	0	+	+		7	0	3+	3+	3+	
8	rr	0	0	+	0	+	0	0	+	0	+	0	+	+	0	+	0	0	+	+	+	0	+	+	0	+	+		8	0	1+	3+	3+	
9	R1R1	+	+	0	0	+	0	+	+	0	+	0	+	+	+	0	+	0	+	+	0	+	0	+	0	+	+		9					
10	R1r	+	+	0	0	+	0	0	+	0	+	0	+	0	+	+	+	0	+	+	0	+	+	+	0	+	+		10					
11	R2R2	+	0	+	+	0	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	+	0	+	+		12					
13	rr	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	rr	0	0	+	0	+	+	0	+	0	+	0	+	0	+	+	0	0	0	+	+	+	0	+	0	+	0		15					
16	rr	0	0	+	0	+	0	0	0	0	+	0	+	+	0	0	+	0	0	+	+	0	+	0	0	+	+		16					
Patient																													AC	2+	4+	3+		
Cord I																													CI	0	1+	2+		
Cord II																													CII	0	2+	2+		
Cord III																													CIII	0	1+	2+		

Additional Serologic Findings

Method	LISS					Saline		PEG		Gel
	Raw					Raw		Raw	3x Ads*	Eluate
Serum	LS.	37°	AHG	CCC		RT	14°	AHG	AHG	
OI	0	0	4+			1+	3+	3+	0	3+
OII	0	0	4+			3+	3+	3+	0	3+
AC	1+	2+	3+		Cord	1+	2+			

*Serum adsorbed 3 times with autologous RBCs pre-treated with a commercial ZZAP solution

Patient Antigen Phenotype

	Rh system				Kell				Duffy		Kidd		Lewis		MNSs				PI	I	H	A ₁
	C	E	c	e	K	k	Kp ^a	Js ^a	*Fy ^a	*Fy ^b	*Jk ^a	*Jk ^b	Le ^a	Le ^b	*S	*s	M	N				
Patient	4+	4+	4+	4+	0				3+	0	2+	2+	0	2+	0	3+	4+	4+				
Pos control	4+	4+	4+	4+	3+				2+	3+	2+	2+	3+	3+	2+	2+	4+	4+				
Neg Control	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0				

*Patient cells treated with EDTA/glycine to obtain a negative DAT

Eleven hours after admission the patient's hemoglobin had fallen from 4.0 to 3.7 g/dL, and he was transfused 2 units of S neg, K neg RBCs which were compatible with autoadsorbed serum. Transfusion was uneventful, and his hemoglobin increased to 7.2. A 3rd unit was given on the 3rd hospital day and he was discharged.

Three days after leaving the hospital a CBC showed hgb/hct = 7.3/21. The patient failed to take his prednisone as prescribed and 17 days later his hgb/hct was 3.7/10.4. He was readmitted, put back on steroids, received intravenous immune globulin for 5 days, and was transfused 4 units of RBCs before being discharged again with hgb/hct = 6.9/20.7.

QUESTIONS:

1. Comment on the clinical findings in the case. (E.G. diagnosis, laboratory findings, response to therapy, clinical course).
2. What is the utility of determining the patient's extended blood group phenotype? Why was EDTA/Glycine necessary for the Duffy, Kidd, and Ss typing?