The incidence of erythrocyte alloimmunization in pregnant women

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AIM OF THE STUDY

To determine the incidence of clinically significant anti-erythrocyte alloantibodies in pregnant women, which can cause severe hemolytic disease in the fetus and newborn.

METHODS

Between the years 2000-2008, a total of 33818 pregnant women were examined at the Department of Transfusion Medicine at the University Hospital Olomouc. Screening for irregular anti-erythrocyte antibodies followed by identification of the alloantibody was performed in all women at the beginning of the pregnancy.

RESULTS

Clinically significant anti-erythrocyte antibodies were diagnosed in 482 cases. The most common cause of maternal alloimmunization was antigen E with an incidence of 5,1‰ (172/33818), followed by antigens D 3,8‰ (127/33818), M 1,4‰ (46/33818), C 1,3‰ (44/33818), K 1,2‰ (41/33818), c 0,6‰ (20/33818), S 0,4‰ (15/33818), Jk^a 0,2‰ (7/33818), PP_{1pk} (Tj^a) 0,1‰ (3/33818) and antigen Fy^a 0,1‰ (2/33818).

CONCLUSION

Despite performing prophylaxis for D alloimmunization by administering anti-D immunoglobulin to Rh(D)-negative women during pregnancy and after the birth of an Rh(D)-positive child, antigen D still represents the 2nd most frequent cause of maternal erytrocyte alloimmunization. The remaining clinically significant alloimmunizations are caused by non-D antigens of the Rh system, antigens of the Kell system, and rarely observed antigens of the MNS and Kidd blood systems.

In the past four years, the incidence of **Rh(D)** alloimmunization in pregnant women was **5‰** in the Olomouc region. If we assume similar results for the Czech Republic, this yearly represents approximately 500 Rh(D) alloimmunized pregnant women for every 100 000 deliveries. If two-thirds of them have an Rh(D) positive child, this yearly represents about **333 fetuses at-risk**. All cases of Rh(D) alloimmunization can theoretically be prevented by prophylactic administration of an adequate dose of anti-D immunoglobulin during all potentially sensitising events.

The incidence of **Kell(K)** alloimmunization in pregnant women in the Olomouc region over the past ten years has been **1,2‰**. If we assume similar results for the Czech Republic, this represents approximately 120 Kell(K) alloimmunized pregnant women per year for every 100 000 deliveries. Assuming a 5% probability that they will have a K-positive fetus, we can therefore yearly expect about **6 fetuses at-risk**. In the Czech Republic, not always is Kell(K) compatible or Kell(K) negative blood administered to women before termination of the reproductive period during transfusion.

Erythrocyte alloimmunization in pregnant women
(No = 33818)

erythrocyte antigen		No	ratio %		incidence ‰	
Rh	D	127	26,3	76,3	3,8	10,9
	C	44	9,1		1,3	
	c	20	4,1		0,6	
	E	172	35,7		5,1	
	e	5	1,0		0,1	
Kell	K	41	8,5		1,2	
MNS	M	46	9,5	12,7	1,4	1,8
	S	15	3,1		0,4	
Kidd	Jk^a	7	1,5		0,2	
Duffy	Fy^a	2	0,4		0,1	
P	PP_{1pk} (Tj^a)	3	0,6		0,1	
		482	100,0		14,3