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The effect of maternal blood transfusion history on alloimmunized pregnancies

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Introduction

Maternal red cell alloimmunization is an important cause of fetal anemia and hemolytic disease of the fetus and newborn (HDFN). The clinical course may differ depending on maternal blood transfusion history.

Methods

This retrospective cohort study analyzed alloimmunized singleton pregnancies with antibodies associated with HDFN from 2018 to 2023.

Results

Among the 76 alloimmunized pregnancies:

- Patients with prior transfusion were more likely to present with anti-K, while those without transfusion history predominantly had anti-D.
- The first antibody titer was obtained later in transfused women (11.0 vs. 9.6 weeks).
- Maximum antibody titers were similar between groups (101.5 vs. 220.2).
- Rates of multiple antibodies, MCA Doppler monitoring, peak MCA PSV ≥ 1.5 MoM, and intrauterine transfusion (IUT) were comparable.

Variable		History of prior blood transfusion (n=36)	No history of prior blood transfusion (n=40)	P-Value
Early pregnancy antibody titer		N=27, 44.9 $\pm$ 115.25	N=27, 39.85 $\pm$ 72.8	0.8
GA at the time of the first titer test (weeks.days)		N=28, 11.02 $\pm$ 2.2	N=27, 9.6 $\pm$ 2.3	0.02
Maximum antibody titer		N=35, 101.5 $\pm$ 251.3	N=40, 220.2 $\pm$ 475.5	0.2
GA at maximum titer (weeks.days)		N=32, 18.8 $\pm$ 9.2	N=39, 22.6 $\pm$ 12.6	0.2
Type of alloimmunization	Big M	0/36 (0%)	4/40 (10%)	<0.001
	Big D	4/36 (11.1%)	21/40 (52.5%)	
	Big E	7/36 (19.4%)	7/40(17.5%)	
	Little c	2/36 (5.6%)	3/40 (7.5%)	
	Kidd	1/36 (2.8%)	1/40 (2.5%)	
	Big K	13/36 (36.1%)	3/40 (7.5%)	
	Big C	3/36 (8.3%)	0 (0%)	
	Big S	2/36 (5.6%)	1/40 (2.5%)	
	Duffy	3/36 (8.3%)	0 (0%)	
	Little e	1/36 (2.8%)	0	
Second antibody		7/36 (19.4%)	8/39 (20.5%)	1
Second antibody maximum titer		N=7, 183.9 $\pm$ 375.2	N=7, 19.6 $\pm$ 47.8	0.3
GA of second antibody maximum titer		N=7, 18.3 $\pm$ 10.9	N=8, 26.8 $\pm$ 9.4	0.1
Was critical titer reached		6/7 (85.7%)	7/8 (87.5%)	1
What was the critical titer		N=6, 194.7 $\pm$ 8.7	N=7, 21.1 $\pm$ 9.2	0.4
GA at which critical titer was found?		N=6 ,14.6 $\pm$ 375.2	N=7, 183.9 $\pm$ 375.2	0.2
Was MCA Dopplers started		25/36 (69.4%)	28/40 (70%)	1
GA first MCA Dopplers started		N=25, 22.3 $\pm$ 5.7	N=27, 23.04 $\pm$ 6.3	0.6
What was the maximum MCA MoM?		N=25, 1.48 $\pm$ 0.3	N=27, 1.48 $\pm$ 0.2	0.9
GA at maximum MCA MoM?		N=25, 28.8 $\pm$ 6.9	N=28, 30.9 $\pm$ 4.7	0.2
Was the maximum MCA MoM $\geq$ 1.5		11/25 (44%)	14/28 (50%)	0.8
What GA MoM was $\geq$ 1.5		N=11, 28.4 $\pm$ 7.1	N=14, 30.1 $\pm$ 4.2	0.5
did the patient ended up needing IUT?		5/11 (45.5%)	6/14 (42.9%)	1

Conclusion

Alloimmunization following maternal blood transfusion is associated with a greater variety of antibodies, yet this variation does not significantly affect the clinical need for MCA Doppler monitoring or IUT.