



Fetomaternal haemorrhage in delivery by cesarean section

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AIM OF THE STUDY

Determine the incidence of fetomaternal haemorrhage (FMH) in deliveries by cesarean section and assess the volume of fetal erythrocytes that infiltrate maternal circulation. Establishing these parameters could allow optimization of recommendations for the prevention of RhD alloimmunization.

WORKING HYPOTHESIS

A 10 µg dose of IgG anti-D administered intramuscularly should cover 0.5 ml of fetal RhD positive erythrocytes or 1ml of whole blood. In the great majority of deliveries, less than 2.5 ml of fetal erythrocytes (5 ml of whole blood, sufficient dose of IgG anti-D 50 µg) enter maternal circulation. During delivery, only rarely does FMH occur, which surpasses 5 ml (10 ml of whole blood, sufficient dose of IgG anti-D 100 µg). In deliveries by cesarean section, the risk of fetal erythrocytes infiltrating maternal circulation is increased.

METHODS

In the study, a total of **1567** examinations were performed. The amount of fetal erythrocytes which infiltrate maternal circulation during delivery by cesarean section was established by flow cytometry using the BDFACSCanto flow cytometer (Becton Dickonson International). Laboratory processing: Fetal Cell Count™ kit (Diagnosis of Feto-maternal Transfusion by flow cytometry), IQ Products, IQP-379.

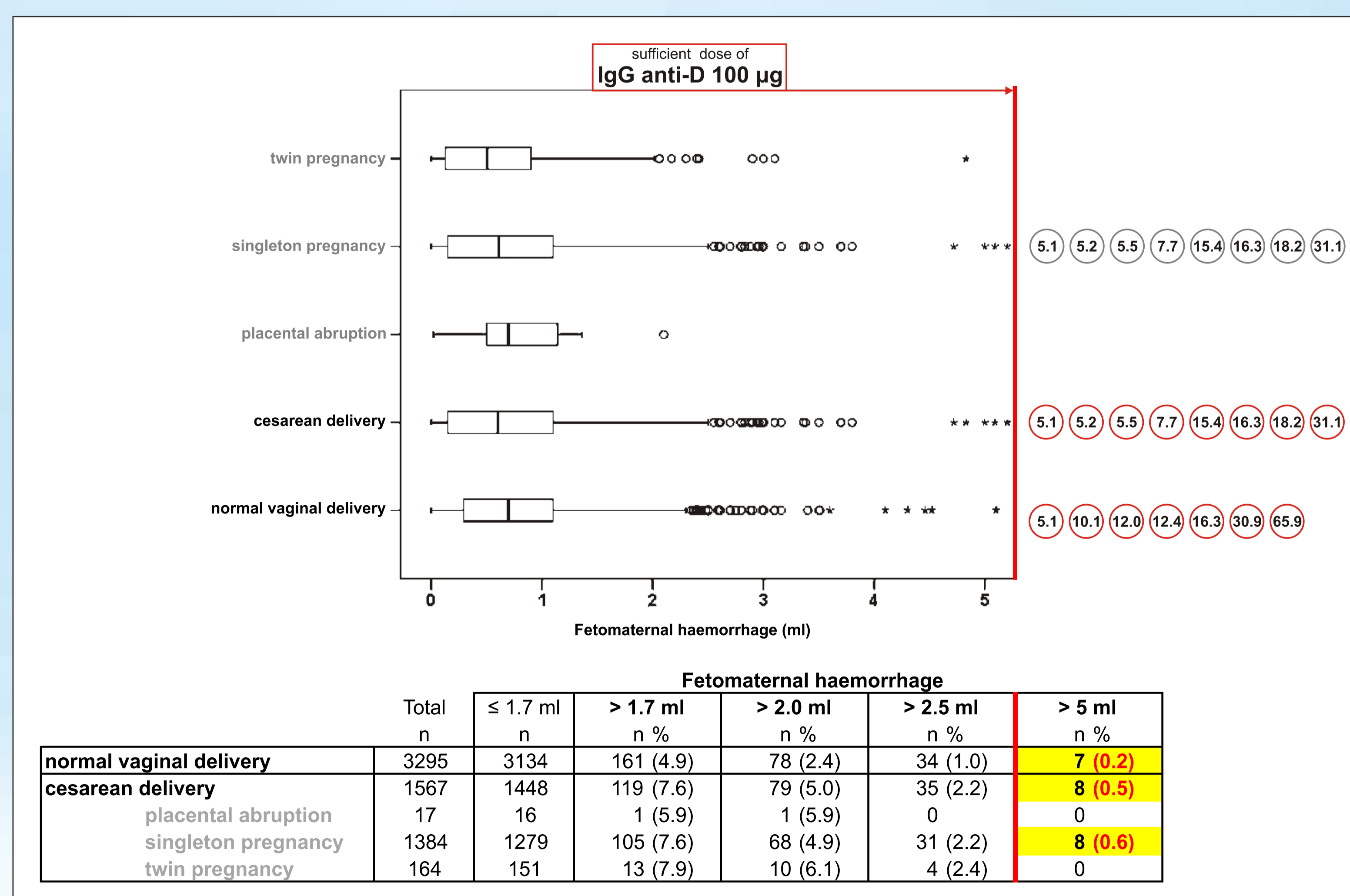
Calculation of the total volume of fetal erythrocytes which infiltrate maternal circulation: Scientific Subcommittee of the Australian and New Zealand Society of Blood Transfusion. Guidelines for laboratory assessment of fetomaternal haemorrhage. 1st ed. Sydney: ANZSBT, 2002: 3-12.

RESULTS

Fetomaternal haemorrhage (FMH) ≤ 2.5 ml (5ml of whole blood) was present in **97.8%** cases of C-section deliveries (1532/1567), and the sufficient dose of IgG anti-D was **50 µg**. FMH ≤ 5 ml (10 ml of whole blood) was seen in **99.5%** cases (1559/1567), and the sufficient dose of IgG anti-D was **100 µg**. In the remaining eight cases, the FMH was 5.1 ml, 5.2 ml, 5.5 ml, 7.7 ml, 15.4 ml, 16.3 ml, 18.2 ml and 31.1 ml (11 ml, 11 ml, 11 ml, 16 ml, 31 ml, 33 ml, 37 ml and 63 ml of whole blood), the sufficient dose of IgG anti-D was 110 µg, 110 µg, 110 µg, 160 µg, 310 µg, 330 µg, 370 µg and 630 µg respectively.

CONCLUSION

In C-section deliveries where an RhD negative mother gives birth to an RhD positive child, it is appropriate to establish the volume of fetomaternal haemorrhage (FMH) in order to determine the dose of IgG anti-D necessary for the prevention of RhD alloimmunization. In 99.5% of cases an IgG anti-D dose of 100 µg was sufficient, contrarily the remaining **0.5%** of cases represented **excessive FMH** where it was necessary to administer a **higher dose**. However, no risk factor was present in these cases.



cesarean delivery (CD)						
FMH (ml)	n (%)	Control group n (%)	Odds Ratio	95% Confidence Interval Lower	95% Confidence Interval Upper	P value
> 1.7	119/1567 (7.6)	161/3295 (4.9)	1.6	1.3	2.0	0.0002
> 2.0	79/1567 (5.0)	78/3295 (2.4)	2.2	1.6	3.0	<0.0001
> 2.5	35/1567 (2.2)	34/3295 (1.0)	2.2	1.4	3.5	0.002
> 5	8/1567 (0.5)	7/3295 (0.2)	2.4	0.9	6.7	0.097

CD - singleton pregnancy						
FMH (ml)	n (%)	Control group n (%)	Odds Ratio	95% Confidence Interval Lower	95% Confidence Interval Upper	P value
> 1.7	105/1384 (7.6)	161/3295 (4.9)	1.6	1.2	2.1	0.0004
> 2.0	68/1384 (4.9)	78/3295 (2.4)	2.1	1.5	3.0	<0.0001
> 2.5	31/1384 (2.2)	34/3295 (1.0)	2.2	1.3	3.6	0.002
> 5	8/1384 (0.6)	7/3295 (0.2)	2.7	1.0	7.5	0.051

CD - placental abruption						
FMH (ml)	n (%)	Control group n (%)	Odds Ratio	95% Confidence Interval Lower	95% Confidence Interval Upper	P value
> 1.7	1/17 (5.9)	161/3295 (4.9)	0.2	0.2	9.2	0.575
> 2.0	0					
> 2.5						
> 5						

CD - twin pregnancy						
FMH (ml)	n (%)	Control group n (%)	Odds Ratio	95% Confidence Interval Lower	95% Confidence Interval Upper	P value
> 1.7	13/164 (7.9)	161/3295 (4.9)	1.7	0.9	3.0	0.096
> 2.0	10/164 (6.1)	78/3295 (2.4)	2.7	1.4	5.3	0.008
> 2.5	4/164 (2.4)	34/3295 (1.0)	2.4	0.8	6.8	0.103
> 5	0					