

Intrauterine transfusions for red blood cell maternofetal incompatibility in monochorionic diamniotic twin pregnancy

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Short title: Intrauterine transfusions in monochorionic twins

Keywords: intrauterine transfusion, Kleihauer-Betke test, monochorionic twin pregnancy, red blood cell alloimmunization, fetal anemia

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1002/uog.20418

Red blood cell (RBC) alloimmunization may cause hemolytic disease of the fetus with severe anemia. Intrauterine transfusions (IUTs) in twin pregnancies represent 1.5% of all fetal transfusions for RBC alloimmunization^{1,2}.

We present a successful case of a monochorionic diamniotic twin pregnancy complicated by severe anti-D maternofetal incompatibility requiring repeated IUTs. This patient was referred to our Centre at 24 weeks of gestation (WG) for suspected fetal anemia. Middle cerebral artery peak systolic velocity (MCA-PSV) reached 1.64 multiples of median (MoM) for twin A and 2.02 MoM for twin B. Both fetuses presented ascites. Twin A was transfused with 30 mL of packed RBC. Pre-transfusion hemoglobin (Hb) was 3.0 g/dL, with a Kleihauer-Betke test (KBT) of 100% on fetal blood^{3,4}. Post-transfusion Hb was 8.9 g/dL and KBT at 18%. The MCA-PSV decreased from 1.64 to 1.19 MoM for twin A and from 2.02 to 1.64 MoM for twin B. Thirty minutes later, since the MCA-PSV was still above 1.5 MoM for twin B, a second IUT of 15 mL was conducted for twin B which enabled to rise the Hb level from 8.1 g/dL to 11.4 g/dL whether the KBT on fetal blood decreased from 17% to 10%. The antiglobuline direct test was 3+ (high intensity) and the cord bilirubinemia was over 70 $\mu\text{mol/L}$, these findings suggesting an on going hemolytic disease. For subsequent IUTs, only twin A was transfused at 25, 27 and 30 WG. This strategy allowed the normalization of the MCA-PSV in both fetuses. (Table 1, figure 1)

A caesarean section was performed at 31 WG for non-reassuring fetal tracing. The first newborn birth weight was 1330g, arterial cord blood pH = 7.37; the Hb =11.3 g/dL and the bilirubin =90 $\mu\text{mol/L}$. The second boy birth weight was 1310g, arterial

cord blood pH = 7.43; the Hb =11.5 g/dL and the bilirubin =88 µmol/L. The placental colored dye injection showed several arterio-arterial anastomoses.

The twins suffered respiratory distress syndrome treated by non-invasive ventilatory support. Severe jaundice worsened despite intensive phototherapy and albumin infusion requiring exchange transfusion in both neonates. Two transfusions at 15 and 45 days were also needed. Neonates were discharged at 66 days of life.

In this case, at first IUT, transplacental inter-twins anastomoses were demonstrated as (i) MCA-PSV values of twin B decreased after the IUT of twin A (ii) the KBT on fetal blood was already modified for twin B before IUT (iii) hemoglobin of twin B before IUT was similar to the one observed in twin A at the end of the IUT. To our knowledge, this is the first case report demonstrating the contribution of MCA-PSV to monitor a monochorionic twin pregnancy complicated with RBC alloimmunization with IUTs of a single co-twin. One case of monochorionic twin pregnancy with IUTs performed alternatively in twin A and twin B has been reported, without using MCA-PSV monitoring². In cases of fetal anemia caused by Rh alloimmunization in monochorionic twin gestations it appears sufficient to transfuse one of the fetuses at 2-3 weeks interval.

Ethics statement: Written consent was obtained from the patient. No human or animal samples were used in the article.

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Figure 1: Longitunal evolution of MCA-PSV values

Hb: hemoglobin ; IUT: intrauterine transfusions ; MCA-PSV: peak systolic velocity of the middle cerebral artery

Table 1: Description of MCA-PSV, hemoglobin and Kleihauer-Betke tests values before and after each IUT

Intrauterine transfusions	GA Volume	MCA-PSV before IUT	Pre-IUT Hb	Post-IUT Hb	KBT before IUT	KBT after IUT	MCA-PSV after IUT
N°1 Twin A Twin B	24 + 3 30 mL - 15 mL	1.64 2.02 1.64	3.0 8.1	8.8 11.4	100% 17%	18% 10%	1.19 1.64 1.02
N°2 Twin A Twin B	25 + 4 44 mL	1.65 1.28	7.2	13.3	10%	5%	0.82 0.79
N°3 Twin A Twin B	27 + 3 36 mL	1.79 1.25	9.3	15.1	0.5%	0.2%	1.06 0.83
N°4 Twin A Twin B	30 + 3 65 mL	1.41 1.43	7,8	13.0	0.06%	0.01%	1.16 0.58

GA: gestational age; Hb: hemoglobin; IUT: intrauterine transfusions; KBT: Kleihauer-Betke test on fetal blood; MCA-PSV: peak systolic velocity of the middle cerebral artery

Gestational ages are expressed in weeks and days; transfused red blood cells volume is expressed in mL (millilitres). MCA-PSV values are expressed in cm/sec and in MoM; Hb are expressed in g/dL.

