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Letters to the Editor

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

Maternal alloimmunization to fetal red-blood-cell (RBC) antigens may cause hemolytic disease in the fetus with severe anemia. Intrauterine transfusions (IUTs) in twin pregnancy represent 1.5% of all fetal transfusions for RBC alloimmunization[1,2]. Here, we present a case of a monochorionic diamniotic twin pregnancy complicated by severe anti-D maternofetal incompatibility, monitored by fetal middle cerebral artery (MCA) peak systolic velocity (PSV) and treated successfully by repeat IUTs of a single cotwin.

The patient was referred to our center at 24 weeks' gestation for suspected fetal anemia. Fetal middle cerebral artery (MCA) peak systolic velocity (PSV) reached 1.64 multiples of the median (MoM) in Twin A and 2.02 MoM in Twin B. Both fetuses presented with ascites. Twin A was transfused with 30 mL of packed RBC. Pretransfusion hemoglobin (Hb) was 3.0 g/dL, with a Kleihauer–Betke test (KBT) result of 100% in fetal blood[3,4]. Post-transfusion Hb increased to 8.8 g/dL and KBT decreased to 18%. MCA-PSV decreased from 1.64 to 1.19 MoM in Twin A and from 2.02 to 1.64 MoM in Twin B. Thirty minutes later, as MCA-PSV remained above 1.5 MoM in Twin B, an IUT of 15 mL was administered to Twin B, which enabled Hb level in Twin B to increase from 8.1 to 11.4 g/dL, and KBT in fetal blood decreased from 17% to 10%. The direct antiglobulin test showed a result of 3+ (high intensity) and cord bilirubin was over 70 μmol/L. These findings were suggestive of ongoing hemolytic disease. For subsequent IUTs at 25 + 4, 27 + 3 and 30 + 3 weeks' gestation, only Twin A was transfused. This strategy allowed for the normalization of MCA-PSV in both fetuses (Figure 1, Table 1).

Cesarean section was performed at 31 weeks' gestation for non-reassuring fetal-heart tracing. The first delivered male neonate had birth weight of 1330 g, arterial cord

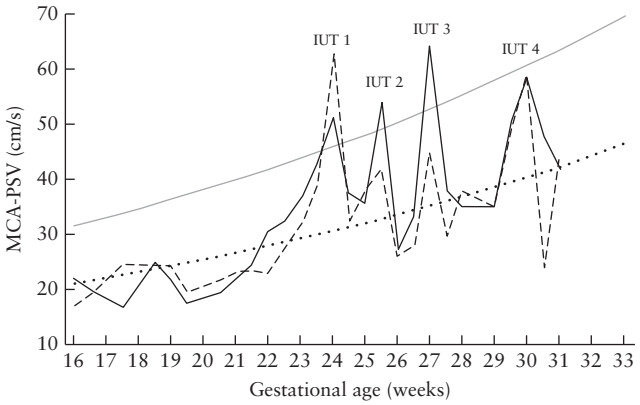

Figure 1 Fetal middle cerebral artery (MCA) peak systolic velocity (PSV) values in Twin A (——) and Twin B (- - -) of monochorionic diamniotic twin pregnancy complicated by fetal anemia due to maternal red-blood-cell alloimmunization, treated by repeat intrauterine transfusions (IUT) of Twin A, according to gestational age. Median (· · · ·) and 1.5 multiples of the median (——) values are shown.

Table 1 Fetal middle cerebral artery (MCA) peak systolic velocity (PSV) multiples of the median (MoM), hemoglobin (Hb) and Kleihauer–Betke test (KBT) values before and after each intrauterine blood transfusion (IUT) in monochorionic twin pregnancy complicated by fetal anemia due to maternal red-blood-cell alloimmunization

			Pre-IUT			*Post-IUT*		
IUT	*GA (weeks)*	*Volume transfused (mL)*	*MCA-PSV MoM*	*Hb (g/dL)*	*KBT (%)*	*MCA-PSV MoM*	*Hb (g/dL)*	*KBT (%)*
First	24 + 3							
Twin A		30	1.64	3.0	100	1.19	8.8	18
Twin B		15*	1.64	8.1	17	1.02	11.4	10
Second	25 + 4							
Twin A		44	1.65	7.2	10	0.82	13.3	5
Twin B		—	1.28	—	—	0.79	—	—
Third	27 + 3							
Twin A		36	1.79	9.3	0.5	1.06	15.1	0.2
Twin B		—	1.25	—	—	0.83	—	—
Fourth	30 + 3							
Twin A		65	1.41	7.8	0.06	1.16	13.0	0.01
Twin B		—	1.43	—	—	0.58	—	—

*Twin B was transfused 30 min after Twin A as MCA-PSV in Twin B remained above 1.5 MoM (2.02 MoM pre-IUT and 1.64 MoM post-IUT). GA, gestational age.

blood pH of 7.37, Hb of 11.3 g/dL and bilirubin of 90 µmol/L. The second neonate had birth weight of 1310 g, arterial cord blood pH of 7.43, Hb of 11.5 g/dL and bilirubin of 88 µmol/L. Placental colored dye injection showed several arterioarterial anastomoses.

The twins had respiratory distress syndrome which was 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. The neonates were discharged at 66 days postpartum.

In this case, during the first IUT, transplacental intertwin anastomoses were demonstrated by (1) MCA-PSV values in Twin B decreasing after IUT of Twin A, (2) KBT in fetal blood already being reduced in Twin B after IUT of Twin A but before IUT of Twin B, and (3) Hb in Twin B being similar to that observed in Twin A after IUT of Twin A but before IUT of Twin B. To our knowledge, this is the first reported case demonstrating the contribution of MCA-PSV to monitoring monochorionic twin pregnancy complicated by RBC alloimmunization, treated by repeat IUTs of a single cotwin. One case of a monochorionic twin pregnancy in which IUTs performed in turn in each cotwin has been reported, without using MCA-PSV monitoring[2]. In cases of fetal anemia caused by Rh alloimmunization in monochorionic twin gestations, it appears sufficient to transfuse only one of the fetuses at 2–3 week intervals.

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Spontaneous regression of twin anemia–polycythemia sequence presenting in first trimester

A 29-year-old woman, para 2, presented with a spontaneous monochorionic diamniotic twin pregnancy at 12 weeks' gestation for ultrasound assessment. Twin A had fetal tachycardia of 192 bpm and reversed a-wave in the ductus venosus. Twin B appeared normal, except for starry-sky appearance of its liver suggestive of polycythemia. Both fetuses had a marginal cord insertion. Crown–rump length, nuchal translucency thickness, bladder filling and amniotic fluid volume were concordant between the fetuses, whereas the middle cerebral artery (MCA) peak systolic velocity (PSV) was 21 cm/s in Twin A and 13 cm/s in Twin B.

At 15 weeks' gestation, Twin A had a MCA-PSV of 47 cm/s (> 1.5 multiples of the median (MoM)) whilst Twin B had a MCA-PSV of 18 cm/s (< 0.8 MoM)[1]. The placental part of Twin A was thickened and bright whereas that of Twin B was thinner and dark[2]. Twin A had lower estimated fetal weight (123 g) and lower amniotic fluid volume (deepest vertical pocket (DVP) of 1.9 cm) than Twin B (145 g and DVP of 3.9 cm). The diagnosis of early twin anemia–polycythemia sequence (TAPS) was made and expectant management was proposed given the early gestation and absence of hydrops in the donor (Twin A). The MCA-PSV of the donor started to improve from 19 weeks' gestation normalizing completely by 21 weeks' gestation (Figure 1).

The pregnancy progressed uneventfully. However, the difference in fetal growth remained, with the ex-donor being on the 5th centile and the ex-recipient on the

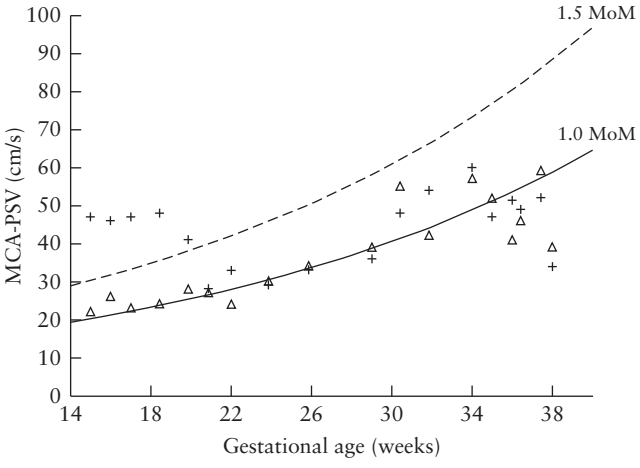

Figure 1 Middle cerebral artery (MCA) peak systolic velocity (PSV) measurements in Twin A ((ex-)donor; +) and Twin B ((ex-)recipient); △) during course of monochorionic diamniotic twin pregnancy. MCA-PSV values of donor were above 1.5 multiples of the median (MoM) in early pregnancy. Intertwin discordance in MCA-PSV decreased from 19 weeks' gestation and disappeared completely by 21 weeks' gestation, suggesting spontaneous regression of twin anemia–polycythemia sequence. Graph was created using Astraia software (Astraia software gmbh, Munich, Germany).

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