A monochorionic diamniotic twin pregnancy with selective fetal growth restriction type 2: sonographic and fetoscopic findings of poor prognosis

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Monochorionic diamniotic (MCDA) twin pregnancies pose a great challenge for the fetal medicine specialist in terms of prevention, diagnosis and management, largely due to the complications of the shared placental circulation.

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About 95% of monochorionic twins have vascular anastomoses on the placental surface that connect the two circulations. The almost continuous blood exchange in these twins accounts for some unique complications, including twin-to-twin transfusion syndrome, twin anemia polycythemia sequence and twin reversed arterial perfusion sequence[1].

It is of particular importance to consider this in cases complicated by selective fetal growth restriction (sFGR) when considering options for management.

A 23-year-old primigravida with spontaneous MCDA twins was referred to our Unit at 16 weeks of gestation due to a marked discrepancy in growth between the foetuses.

In the first trimester of pregnancy, the discrepancy in the nuchal translucencies was not marked (1.7mm vs. 1.9mm) but the difference in the crown-rump lengths was 21% (63.4mm vs. 80.4mm).

At 17 weeks, the discrepancy in the estimated fetal weight (EFW) between the foetuses was 45%. Doppler findings in the small twin were abnormal flow in both umbilical arteries and reversed “a” wave in the ductus venosus [Figure 1], while the other twin had normal Doppler’s. Hence, the diagnosis was MCDA twins with pure sFGR type 2.

In view of the rapid deterioration of the small twin and the high chance of intrauterine demise, Laser separation of the placental circulations was recommended. This was largely to protect the wellbeing of the healthy twin by avoiding the exsanguination of this twin through the placental anastomoses.

The fetoscopic surgery was performed uneventfully under local anaesthesia. During the fetoscopy, a sequential Laser placental ablation was performed, identifying 6 anastomoses (5 arteriovenous [AV] and 1 arterioarterial [AA]).

The patient was discharged the day of the surgery after checking cardiac activity in both foetuses. One week later, the patient had rupture of the membranes and four weeks after the surgery the small twin died. The surviving twin was born at 34 weeks and 4 days weighing 2327 grams.

Among the identified anastomoses during the fetoscopy, one AV anastomosis from the small foetus to the normal one showed a fluctuant colour [Figure 2] which is rare in this type of anastomoses that usually have unidirectional flow.

The explanation for this finding originates in the poor general condition of the small twin with low central blood pressure due to a lack of oxygenation. This in turn produces a low vascular pressure in the placental branches of its umbilical arteries that is not high enough to overcome the pressure of the umbilical vein branches of the normal twin at the level of the AV anastomosis which leads to a fluctuant change of colour. This loss of blood into the small twin through the AV anastomosis causes a reduction of oxygenated blood flow to the healthy twin.

In conclusion, in addition to the ultrasound findings of ominous prognosis (discrepancy in the EFW between the twins, abnormal Doppler's in the small twin, gestational age at the moment of the surgery (the earlier, the worse) and the cervical length[2,3]), we report a fetoscopic sign of poor prognosis for the growth-restricted twin reflecting its critical condition: an AV anastomosis with atypical bidirectional flow.

References

1. Lewi L, Deprest J, Hecher K. The vascular anastomoses in monochorionic twin pregnancies and their clinical consequences. Am J Obstet Gynecol. 2013 Jan;208(1):19-30. DOI: 10.1016/j.ajog.2012.09.025

2. Peeva G, Bower S, Orosz L, Chaveeva P, Akolekar R, Nicolaides KH. Endoscopic Placental Laser Coagulation in Monochorionic Diamniotic Twins with Type II Selective Fetal Growth Restriction. Fetal Diagn Ther. 2015;38(2):86-93. DOI: 10.1159/000374109

3. Ishii K, Murakoshi T, Hayashi S, Saito M, Sago H, Takahashi Y, Sumie M, Nakata M,

Matsushita M, Shinno T, Naruse H, Torii Y. Ultrasound predictors of mortality in monochorionic twins with selective intrauterine growth restriction. Ultrasound Obstet Gynecol. 2011 Jan;37(1):22-6. DOI: 10.1002/uog.8846

Figure Legend

Figure 1. Discrepancy in size between the twins and reversed “a” wave in the ductus venosus of the growth-restricted fetus.

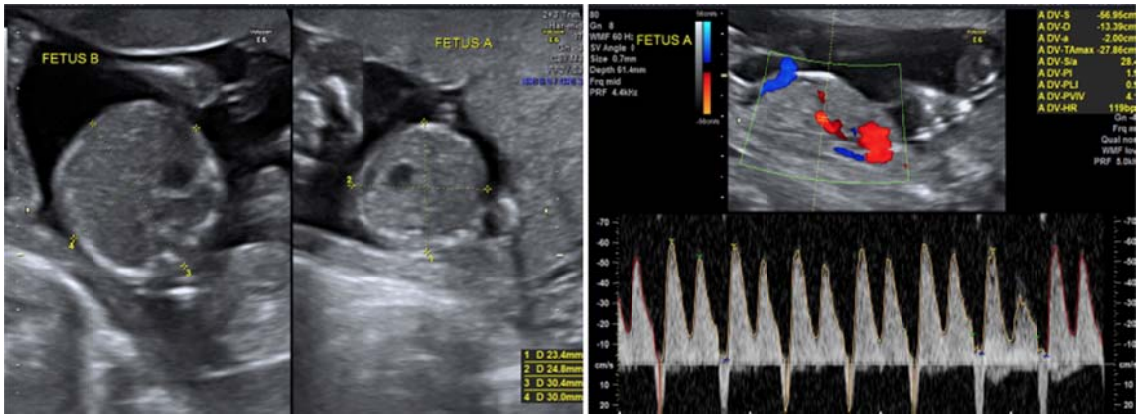

Figure 2. Arterio-venous anastomosis from the small twin (artery-lower part) to the normal one (vein-higher part) showing alternating colours on fetoscopy (Video available Online).