CASE REPORT

Intrafetal Laser Ablation of Umbilical Vessels in Acardiac Twin with Successful Outcome

Tayal Tulika · Kaul Anita

Received: 25 June 2009 / Accepted: 22 June 2012 / Published online: 19 March 2013
© Federation of Obstetric & Gynecological Societies of India 2013

Introduction

The incidence of acardiac twin (the preferred term is TRAP—Twin Reversed Arterial Perfusion sequence) is approximately 1:35,000 pregnancies. This is characterized by vascular anastomoses in combination with partial or complete lack of cardiac development in one of the twins. The poor outcome with increased morbidity and mortality (50–70 %) has been noted in the normal twin due to congestive heart failure, hydramnios, and preterm labor.

Case Report

A 26-year-old primigravida was referred at approximately 18 weeks of gestation with Monochorionic Diamniotic twin gestation complicated by the TRAP Sequence.

On the ultrasound scan, Twin A appeared structurally normal with polyhydramnios. The estimated birth weight of the fetus was 287 g.

Objective

We present a case of acardiac twin treated with a minimally invasive method (laser coagulation) which resulted in a successful outcome, especially for the healthy twin.

Twin B was acardiac, Fig. 1, and noted to have several structural anomalies including ventriculomegaly, a flat face, and absent stomach with normal blood flow in the perivesical arteries, Fig. 2. The diagnosis of TRAP sequence and the retrograde blood flow by Dopplers was confirmed, Figure 3. Both limbs were moving in Twin B and EBW was 161 g with a weight discrepancy of almost 56 % between the twins.

The management options were discussed with the couple including termination of the pregnancy, as there was a high probability of cardiac failure in the pump twin, expectant management allowing nature to follow its course, or interruption of the blood supply to the acardiac twin using intrafetal laser ablation of umbilical vessels, Fig. 4.

The parents opted for the laser ablation and this was planned once early changes of cardiac failure were documented in Twin A. The parents were aware of complications, including the death of Twin A, following laser.

Amniocentesis of about 2 l of amniotic fluid was performed at 23 weeks for progressive polyhydramnios. The fetal Karyotype was performed at the same time and was normal. At 26 weeks, tricuspid regurgitation was noted in Twin A; therefore, intrafetal laser ablation of perivesical blood vessels was done using Nd:YAG Laser 400 microns laser fibers through an 18 Gz procedure needle till Color Doppler flow studies confirmed interruption of the blood

Tayal T., Clinical Fellow · Kaul A. (✉), Consultant in Fetal Medicine
Gate No. 7, Fetal Medicine Unit, Indraprastha Apollo Hospital,
New Delhi 44, India
e-mail: anitagkaul@gmail.com

Fig. 1 2D scan photograph showing absent heart in Twin B

Fig. 2 2D scan photograph showing perivesical vessels

Fig. 3 2D scan photograph showing Doppler retrograde blood flow umbilical arteries in Twin B

supply to the abnormal fetus, Fig. 5, under local anesthesia, IV sedation, and under USG guidance. Amniodrainage was repeated around Twin A.

Fig. 4 Photograph showing principle of laser ablation management

Fig. 5 2D scan photograph showing hyperechogenic post-ablated blood vessels in Twin B

At 33 weeks, fetal growth was maintained and amniotic fluid appeared to be reducing and Twin B appeared to be shrinking. At 35 weeks and 5 days, an emergency LSCS was done for reduced fetal movements and a live female baby with a birth weight of 2,300 g was delivered with the Apgars 8/9/9 along with Twin B, Fig. 6.

Discussion

Twin reverse arterial perfusion sequence (TRAP sequence) affects 1 % of monozygotic twins and 1 in 30 triplets.

The proposed pathophysiology for this condition is that there is a presence of artery to artery and vein to vein anastomoses in a monozygotic placenta, resulting in a hemodynamically advantaged twin (pump twin) perfusing

Fig. 6 Photograph showing delivered acardiac Twin B with abnormal head and facial features

the acardiac twin via the retrograde flow through the placental anastomoses.

There is a reversal of flow in the recipient twin with relatively oxygenated blood flowing from the abnormal anastomoses to the umbilical artery of the acardiac twin, the flow then proceeding cranially, leaving the fetus via the umbilical vein; hence the term TRAP sequence [1].

In 75 % of cases, the umbilical cord of the recipient twin contains a single umbilical artery. Chromosomal anomalies may be present in up to 50 % of cases of acardiac fetus and congenital anomalies are present in about 9 % of pump twins. When the ratio of the weight of the acardiac fetus to

the weight of the donor fetus is greater than 70 %, the incidence of preterm delivery is 90 %, polyhydramnios is 40 %, and congestive heart failure is 30 % in the pump twin as was seen in our case.

There is great evolution noted in the management of the TRAP Sequence. Several techniques have been devised to interrupt the vascular communications between the two twins, including selective fetectomy, ultrasound-guided thrombosis of the umbilical cord, umbilical cord ligation, laser photocoagulation of the umbilical vessels, bipolar coagulation of the umbilical cord, or intrafetal radiofrequency ablation [2].

Summary

Laser ablation of the umbilical vessels under USG guidance, a minimally invasive fetal surgery without the use of a fetoscope, is a promising management option for acardiac twin with a successful outcome.

References

1. Barth RA, Crow HC. Ultrasound evaluation of multifetal gestations. In: Callen PW, editor. Callen ultrasonography in obstetrics and gynaecology. 4th ed. Pennsylvania: Saunders; 2000. p. 196–8.
2. Ruben A, Quintero MD. Diagnostic and operative fetoscopy. New York: Parthenon publishing; 2002. p. 55–7.