Case Report of Autopsy and Placental Examination After Radiofrequency Ablation of an Acardiac Twin

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ABSTRACT

We report the autopsy and placental findings in a monochorionic twin gestation complicated by twin reversed arterial perfusion (TRAP) sequence. Radiofrequency ablation (RFA) was performed at 24 weeks gestation to abort the acardiac fetus, and vaginal delivery of the co-twin and acardiac fetus occurred at 33 weeks gestation. An autopsy of the acardiac fetus revealed multiple congenital anomalies including complete absence of the upper extremities and poor development of the skull and facial structures. In contrast to the upper body, the lower half of the body, although malformed, was more developed. The monochorionic twin placenta showed velamentous, atrophied, proximal artery-artery and vein-vein intertwin vascular connections which essentially bypassed the placental parenchyma for the acardiac fetus. Ink injection and histologic examination confirmed thrombosis of these critical intertwin vascular connections after RFA. This report highlights the fetal and placental anatomy of TRAP sequence and stresses the importance of placental examination after fetal surgical techniques.

Keywords: fetal laser coagulation, pathophysiology, monochorionic twin, acardiac twin, laser ablation, twin reversed arterial perfusion (TRAP)

Approximately 20% of all twin pregnancies are monochorionic. One of the most important complications is twin-to-twin transfusion syndrome (TTTS), which is characterized by a shift of blood volume from the donor twin to the recipient twin through placental vascular connections.[1] The twin reversed arterial perfusion (TRAP) sequence, also known as *acardiac twinning*, is the most severe form of chronic TTTS. The TRAP sequence affects 1% of monochorionic pregnancies and 1 of 35,000 pregnancies overall[2] and is associated with significant prenatal mortality if untreated.[3] Twin pregnancy with an acardiac twin is associated with superficial intertwin vascular anastomoses that result in bypass of placental tissue for the acardiac twin. These connections typically consist of a large artery-artery (A-A) connection and a large vein-vein (V-V) connection between the superficial chorionic vessels of the fused twin placentas, resulting in lack of connection to the placental villous parenchyma for the acardiac twin. Therefore the co-twin, known as the *pump twin*, perfuses the acardiac twin via the A-A connection, resulting in reversed circulation for the acardiac twin. Because placental vascular anatomy is a major contributor to adverse outcome in monochorionic twin pregnancies, understanding monochorionic twin-associated placental pathology is important.

In this case report, we present the autopsy findings in an acardiac twin with multiple congenital anomalies. Also, we highlight the importance of documenting placental vascular connections and confirming the sequelae of fetal surgical techniques via placental examination.

Abbreviations:

TTTS, twin-to-twin transfusion syndrome; TRAP, twin reversed arterial perfusion; A-A, artery-artery; V-V, vein-vein; RFA, radiofrequency ablation; A-V, arteriovenous

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Case Report

A 24-week-old acardiac African American fetus (twin B) of a 21-year-old African American woman designated