Fetus Acardius Amorphous Mimicking Placental Teratoma on Prenatal Imaging: A Case Report

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ABSTRACT

Twin reversed arterial perfusion (TRAP) sequence is a rare complication of monochorionic pregnancies in which an acardiac twin depends on a normal "pump" twin for circulation. We present a case of a vascular placental mass identified on prenatal ultrasound at 28 weeks. Fetal MRI demonstrated a 4.7 × 3.5 × 4.6 cm solid mass attached to the placenta by a vascular stalk without identifiable fetal structures. Placental teratoma and fetus acardius amorphous were considered; however, absent reversed arterial flow made TRAP less likely. Postnatal histopathology confirmed fetus acardius amorphous, highlighting the importance of considering this diagnosis in atypical placental masses despite absent classic Doppler findings.

INTRODUCTION

Acardiac twin, also known as twin reversed arterial perfusion (TRAP) sequence, is a rare congenital anomaly most commonly occurring in monozygotic monochorionic twin pregnancies, with an estimated incidence of 2.6%.[1,2] It is characterized by a malformed twin lacking functional cardiac structures that is entirely dependent on a hemodynamically normal "pump" twin for circulation. Prenatal diagnosis is typically achieved through ultrasonography with Doppler studies, enabling early identification and intervention to reduce morbidity and mortality in the pump twin. However, atypical presentations—particularly the amorphous subtype—may lack classic sonographic features and pose significant diagnostic challenges.[3] Distinguishing fetus acardius from placental teratoma relies on pathologic features such as the presence of an umbilical cord and evidence of axial organization, which may be subtle or unrecognized antenatally.[4] Failure to identify this entity prenatally can complicate counseling, delivery planning, and postnatal evaluation. We present a rare case in which a mass identified was not suspected to represent an acardiac twin until histopathologic examination following delivery. Notably, the pump twin was born healthy without evidence of cardiovascular compromise.

CASE DESCRIPTION

A 32-year-old G3P2012 woman with a medical history significant for obesity, depression, and prior gestational hypertension presented for prenatal care during her third pregnancy. At approximately 28 weeks gestation, ultrasonography identified a single umbilical artery, a fetal ventricular septal defect (VSD), and a placental/umbilical cord mass. Due to these findings, fetal magnetic resonance imaging (MRI) was performed at about 30 weeks gestation and demonstrated a 4.7x3.5x4.6 cm complex/solid mass primarily composed of fatty tissue without identifiable fetal structures attached by a vascular stalk extending from the placental surface. Differential considerations included benign placental teratoma and fetus acardius amorphous; however, absent reversed arterial flow made TRAP sequence less likely prenatally. Ongoing antenatal surveillance with twice-weekly fetal testing was subsequently initiated. Follow-up imaging continued to demonstrate the placental mass, persistent single umbilical artery, and a decreasing VSD in size. The pregnancy later became complicated by preeclampsia without severe features at 35 weeks' gestation and delivery was planned at 37 weeks. At 37 weeks and 1 day of gestation, the patient underwent repeat low transverse cesarean section and delivered a viable male infant weighing 2.92 kg with Apgar scores appropriate for gestational age. The neonate remained hemodynamically stable without evidence of cardiovascular compromise. Gross placental examination identified a distinct exophytic mass attached to the placenta by a vascular stalk (Figure 1). Histopathologic examination demonstrated findings consistent with fetus acardius amorphous, establishing the diagnosis postnatally. Maternal postoperative recovery and neonatal postpartum course were otherwise uncomplicated

CASE DISCUSSION

Twin reversed arterial perfusion (TRAP) sequence is a rare complication of monochorionic multifetal gestations in which an acardiac twin receives retrograde perfusion from a structurally normal "pump" twin through abnormal placental vascular anastomoses.[1] This abnormal circulation results in severe maldevelopment of the recipient twin and may impose significant hemodynamic stress on the pump twin. The acardius amorphous subtype is the least differentiated form and may appear as a shapeless placental or extra-fetal mass without recognizable fetal anatomy, making prenatal diagnosis particularly challenging.[5] Ultrasonography with Doppler imaging is the primary diagnostic modality for TRAP sequence, with reversed arterial perfusion representing a characteristic finding.[3] In this case, prenatal imaging demonstrated a vascular placental mass attached by a stalk without recognizable fetal structures; however, reversed arterial flow was absent. Consequently, placental teratoma remained a leading consideration. This illustrates the diagnostic difficulty of atypical TRAP presentations, particularly the amorphous subtype. Distinguishing fetus acardius amorphous from placental teratoma may not be possible with prenatal imaging alone. Placental teratomas can similarly contain tissues from multiple germ layers and resemble acardiac masses radiographically and grossly.[3,6] Histopathologic findings such as umbilical cord attachment, axial organization, or partial fetal development favor fetus acardius, whereas placental teratomas lack organized fetal structures and true cord formation.[4] In this case, histopathologic examination established the definitive diagnosis.

The prognosis of the pump twin depends largely on the size and vascular demand of the acardiac twin, with increased demand potentially resulting in high-output cardiac failure, hydrops, polyhydramnios, and preterm delivery.[7] Despite these risks, the pump twin in this case remained hemodynamically stable. This case emphasizes that fetus acardius amorphous should remain in the differential diagnosis of atypical placental masses even when classic Doppler findings are absent.

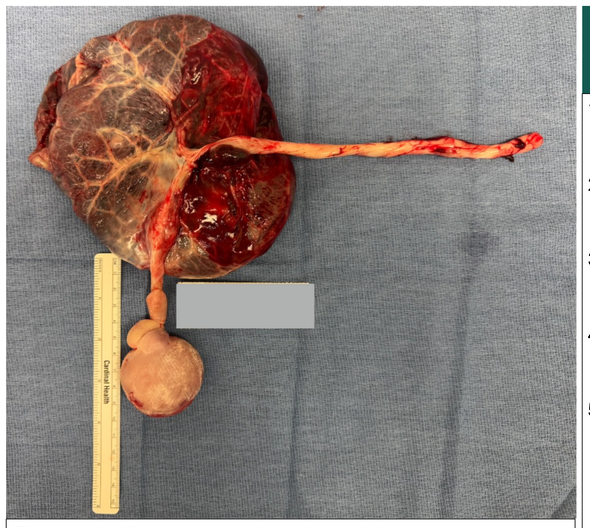

Figure 1: Gross examination of the placenta following delivery demonstrating a distinct exophytic mass attached to the placental surface by a vascular stalk. The lesion appeared as a well-circumscribed extra-fetal mass without obvious external fetal morphology

REFERENCES

1. Quaas, P., Markfeld-Erol, F. 'TRAP-ped with an Acardius': Case Series of Twin Reversed Arterial Perfusion (TRAP) Sequence and Review of Literature. J. Fetal Med. 8, 27–33 (2021)
2. van Gemert MJ, van den Wijngaard JP, Vandenbussche FP. Twin reversed arterial perfusion sequence is more common than generally accepted. Birth Defects Res A Clin Mol Teratol. 2015;103(7):641-643
3. Singh P, Bansal S, Ghuman N, Elhence P. Fetus Acardiac Amorphous Presenting as Placental Tumor: A Rare Case and Differentiating the Two. J Med Ultrasound. 2021;29(4):281-283. Published 2021 May 14
4. Gaffar BAA, Hotait HY, Gamlouch SF, Swalaha NJ. Placental teratoma or fetus acardius amorphous? Hematology/Oncology and Stem Cell Therapy. 2008;1(1):57–61
5. Nicolì P, Damiani GR, Gaetani M, Dellino M, Vitagliano A, Malvasi A, Cazzato G, Cascardi E, Marzullo A, Alfonso R, et al. "The Strange Case of Dr Pump and Mr Acardiac": The Twin Reversed Arterial Perfusion (TRAP) Sequence in Two Monochorionic Monoamniotic (MCMA) Twin Pregnancies—Diagnosis, Prognosis and Management: Review of Literature. Diagnostics. 2023; 13(19):3109
6. Ben Thayer M, Bel Hadj Kacem L, Blel A, Ajouli W, Ksentini M, Rammeh S. Unexpected placental tumor: A case report. Int J Surg Case Rep. 2024 Aug;121:110007
7. Shashidhar B, Kumar BN, Sheela R, Kalyani R, Anithae N, Reddy PS. Twin reversed arterial perfusion (TRAP) sequence: (Acardius Amorphous) A case report and review of literature. Int J Biol Med Res. 2012;3:1453–5