Twin Reversed Arterial Perfusion (TRAP) Sequence - A rare entity

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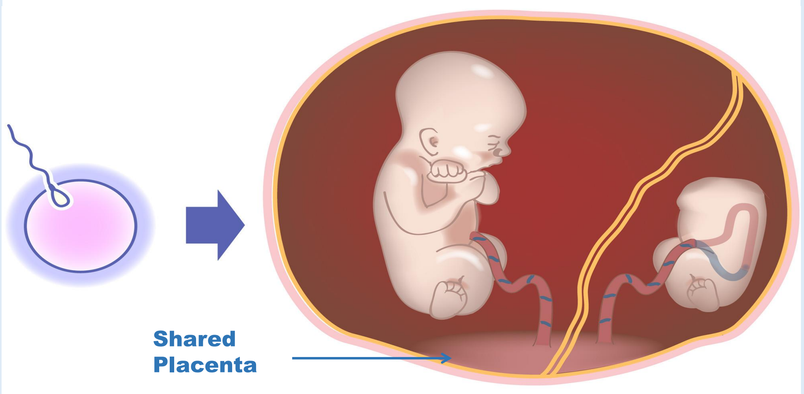
Introduction

Twin reversed arterial perfusion (TRAP) sequence refers to a complication seen in 1/100 of monochorionic twin pregnancies in which a twin with an absent or a non-functioning heart ("acardiac twin") is perfused by its co-twin ("pump twin") via placental arterial-arterio anastomoses (Healy, 2010).The acardiac twin usually has a poorly developed heart, upper body, and head. The pump twin is at risk of heart failure and problems related to preterm birth.



Patient Background

A 17-year-old para 0+0 presented to our fetal assessment unit (FAU) for her booking ultrasound scan at 13 weeks gestation .

There was no medical, surgical and family history of note.

During a transabdominal ultrasound scan an intrauterine monochorionic monoamniotic twin pregnancy was noted.

Ultrasound Examination

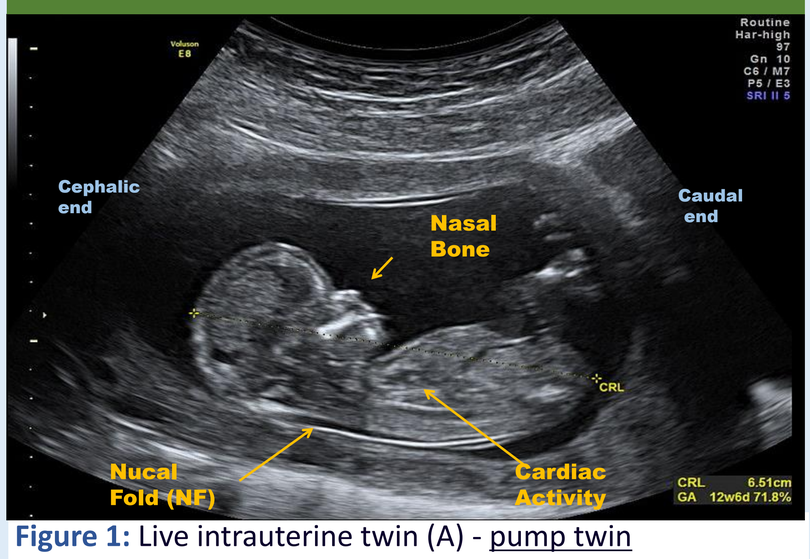


Figure 1: Live intrauterine twin (A) - pump twin
CRL measurement of 13 weeks and 1 day consistent with LMP dates. Fetal heart rate was 159 beat per minute via pulsed waved Doppler.

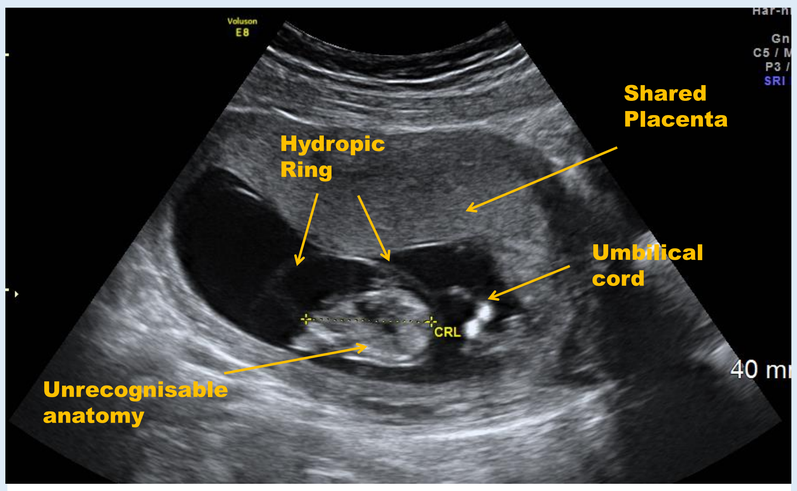


Figure 2: Acardiac twin (B)

Heterogeneous mass of tissue (4.2x3.2x3.3cm) surrounded by a large hydropic ring. BPD and HC measurements could not be performed as the fetal cranium could not be identified. No abdominal or thoracic organs were identified.

One placental site was noted, and no dividing membrane was visualised between the embryos, suggestive of a monochorionic monoamniotic twin pregnancy.

CLASSIFICATION	DESCRIPTION
Acardiac acephalus	Absent head with thoracic organs
Acardiac acormus	Presence of head only
Acardiac anceps	Head is poorly formed
Acardiac amorphus	Unrecognisable anatomy

Figure 3: Ultrasound appearance suggests twin B matches the acardiac amorphus TRAP classification due to the degree of cephalic and truncal mal-development.

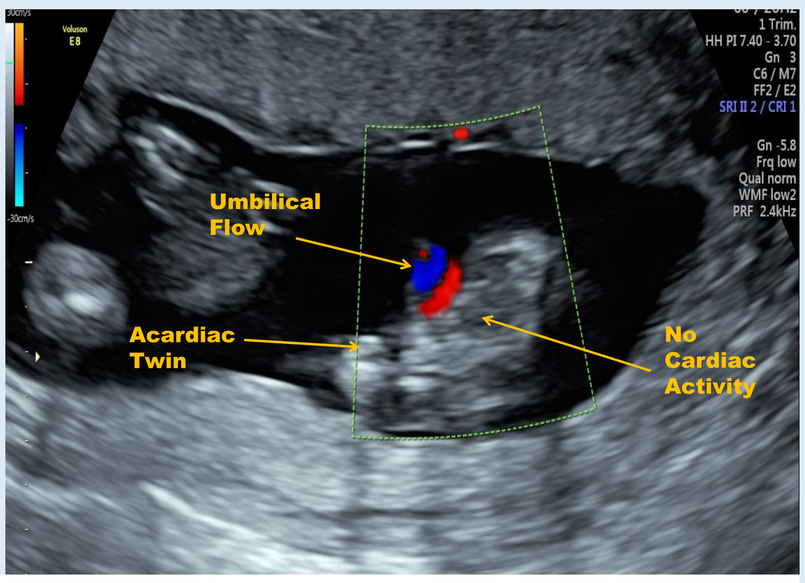


Figure 4: Colour Doppler was applied to assess fetal circulation- reversed perfusion in the acardiac twin via the umbilical artery is seen, suggestive of TRAP sequence. No fetal cardiac activity was noted on colour Doppler.

Management

Following her booking scan the woman was referred to a tertiary fetal assessment unit by her consultant obstetrician for a fetal medicine specialist review .

A diagnosis of TRAP sequence in monochorionic monoamnionotic twins with an acardiac twin of acardius acephalus type was made. Due to the high risk of possible complications for the pump twin weekly follow up in this high risk clinic was organised.

Serial ultrasounds examinations were performed at 13+5, 15+2, 18 +2 and 20+2 weeks. On the final ultrasound exam the acardiac twin had demised, the pump twin showed no signs of polyhydramnious, fetal hydrops or heart failure. The decision was made to transfer her care back to our unit for routine antenatal care, regular ultrasound surveillance and delivery.

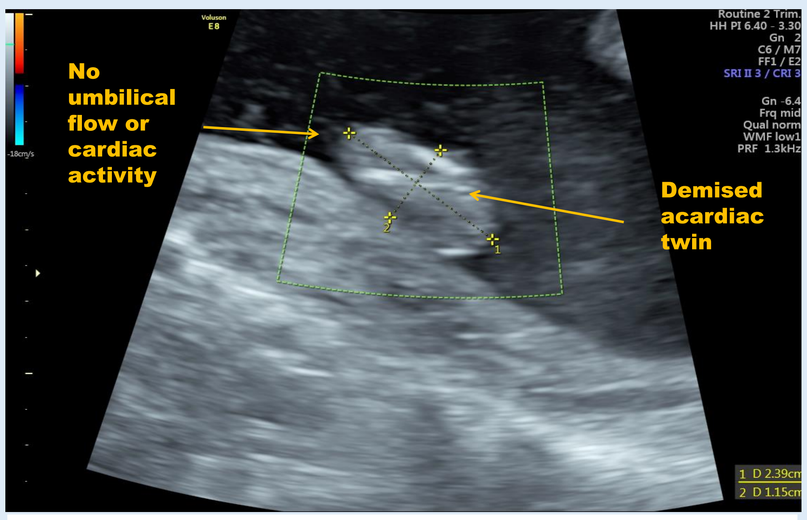


Figure 5: During the mid trimester anatomy scan at 22 +2 weeks the acardiac twin was greatly reduced in size to 2.1x1.5x1cm. It was not hydropic, no blood flow was noted on colour Doppler hence fetal demise was evident.

Anomaly Scan

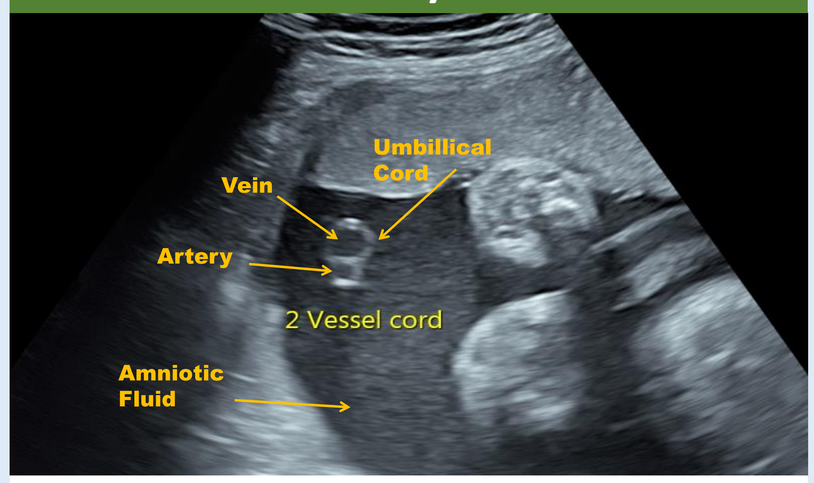


Figure 6 : TS section of the umbilical cord within the amniotic fluid. A two vessel cord (single umbilical artery) belonging to the normal fetus (pump twin) was noted. This is seen in 66% of TRAP sequence cases.

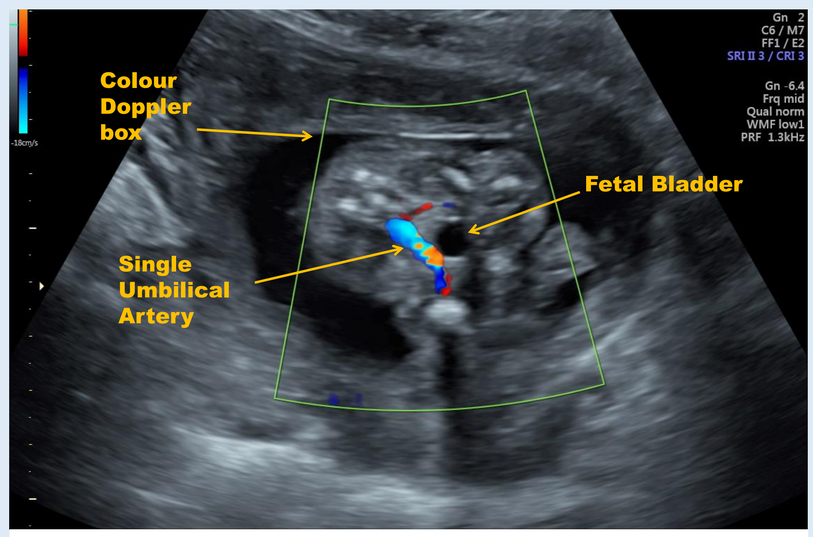


Figure 6: Examination of the fetal pelvis demonstrating only one umbilical artery lateral to the bladder in its course toward the umbilical cord.

All third trimester follow up ultrasound scans displayed normal interval growth, normal umbilical artery Dopplers and normal biophysical profiles. The pump twin delivered by SVD at 39 weeks gestation weighing 3.1kg with Apgar scores of 9 at both 1 and 5 mins and was discharged home after an uneventful neonatal course.

Discussion

The goal of antepartum management of a pregnancy complicated by TRAP sequence is to maximize outcome for the structurally normal pump twin. Doppler ultrasonography aids in the diagnosing of this rare sequence even in the first trimester, thereby improving the prognosis.

Accurate and early antenatal diagnosis is essential for better prognosis. A sonographer should have a high index of suspicion during ultrasound imaging if there is monochorionic twin pregnancy with a fetus which, in spite of an absence of cardiac activity, continues to grow (Pagini et al, 2013).

References

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