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## Agenesis of ductus venosus in relation to perinatal outcomes-experience from a tertiary care centre

Lalitha Natarajan<sup>1</sup>  
INSTITUTION: <sup>1</sup>. Fetal Medicine, PSG Institute of Medical Sciences and Research, Coimbatore, India.

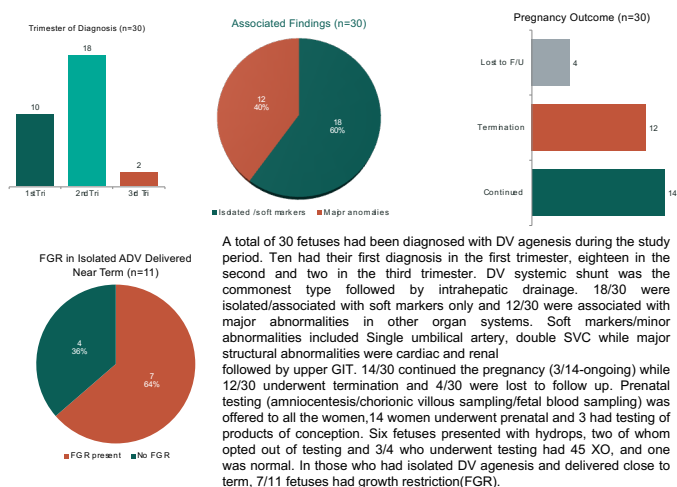
### Introduction

- The ductus venosus (DV) shunts oxygenated umbilical venous blood past the liver toward the left atrium — a critical component of the fetal umbilical–portal–DV complex. Agenesis of the DV (ADV) is uncommon; when it occurs, umbilical blood is diverted either directly into the systemic circulation (extrahepatic) or through an intrahepatic portal route — a distinction long known to affect prognosis. ADV is associated with structural malformations (cardiac, renal, GI), soft markers, and chromosomal/genetic abnormalities — classically monosomy X and trisomy 21. Isolated ADV is generally favourable, but fetal growth restriction (FGR) remains a recognised association.
- Objective:** To review our institutional experience with prenatally diagnosed ADV — drainage type, associated anomalies, genetic outcomes, and perinatal outcome — to refine prenatal counselling.

### Methods

This was a retrospective analysis of cases studied at the Fetal Medicine Unit of a tertiary care teaching hospital in South India between August 2019 - March 2026. Clinical details, ultrasound findings, gestational age at diagnosis, results of prenatal/postnatal tests, other system anomalies, mode and timing of delivery, birthweight and perinatal outcomes were analysed. Invasive prenatal testing was offered to all; postnatal testing of products of conception offered where pregnancy was terminated.

### Results



#### TYPES OF VENOUS SHUNT IN DV AGENESIS

- Type I — Umbilical–systemic shunt (umbilical vein bypasses the liver entirely)
- Type II — Ductus venosus–systemic shunt (short DV drains directly to IVC/hepatic vein)
- Type IIIa — Intrahepatic portal–systemic shunt (best reported outcomes)
- Type IIIb — Extrahepatic portal–systemic shunt

### Discussion

- Prognosis in ADV depends chiefly on the route of venous drainage and on associated structural/genetic abnormalities, not on absence of the DV per se. Intrahepatic (portal-routed) shunts generally fare better than shunts that bypass the liver entirely, consistent with prior umbilical–portal–systemic shunt classifications. Monosomy X (45,XO) predominance among tested hydropic fetuses matches earlier literature identifying monosomy X and trisomy 21 as the leading aneuploidies in ADV. Cardiac and renal anomalies led the non-isolated group, concordant with existing reports on associated defects in non-isolated ADV. FGR was frequent even in isolated ADV reaching late gestation — supporting continued growth surveillance regardless of structural findings.
- Our non-isolated rate (40%) is broadly in line with large reviews reporting associated abnormalities in ~76–83% of ADV cases (Mash et al. 2024; Pacheco et al. 2018).
- Monosomy X as the leading aneuploidy among our tested hydropic fetuses mirrors Moaddab et al.'s multicentre review, in which monosomy X was the most frequent chromosomal abnormality in ADV.
- Cardiac and renal predominance among structural anomalies parallels prior series identifying cardiac defects as the most common association in non-isolated ADV
- Limitations:** retrospective, single-centre; incomplete genetic-testing uptake; 4 lost to follow-up; small subgroup numbers.

### Conclusion

- Isolated ADV with a DV systemic shunt carries a generally favourable prognosis.
- FGR is the most common adverse finding in isolated cases reaching late gestation.
- Multisystem structural abnormalities or hydrops raise suspicion for an underlying genetic abnormality, most notably monosomy X.
- Drainage route + detailed anomaly scan + fetal echocardiography + genetic counselling together should guide prognosis and management.**

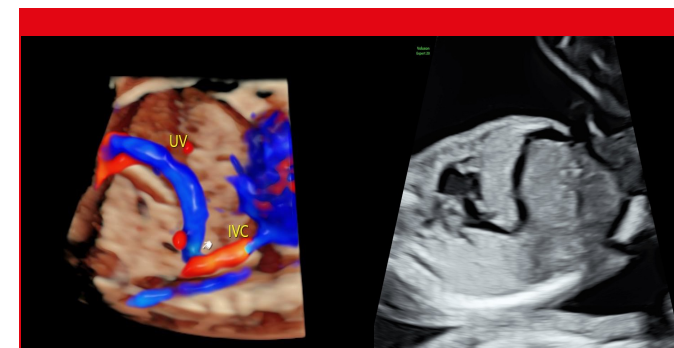


Figure 1. DV systemic shunt (Achiron type 2)

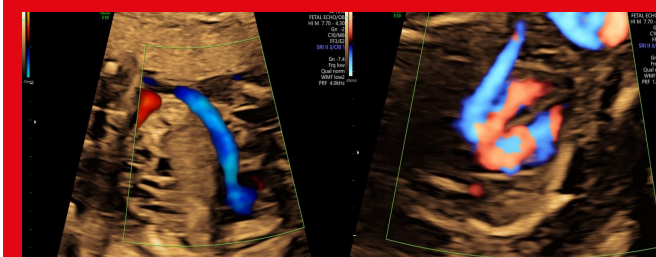


Figure 2. Umbilical systemic shunt (Achiron type 1)

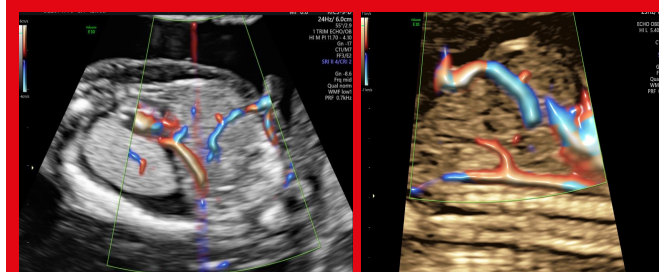


Figure 3. ADV with intrahepatic drainage-1<sup>st</sup> trimester (left) and second trimester (right)