

EP08.66 The vanishing ‘V’ sign in late third trimester: spectrum of ductus arteriosus abnormalities and real-time functional ductal closure (rare documentation)

Sonal O. Gupta 3,1, Kavita Aneja2,Omprakash P. Gupta5.4, Devi Lal 6, Himani Pandey7

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OBJECTIVE

To evaluate the diagnostic significance of vanishing ‘V-sign’ on 3VV in the late third trimester as a marker of the structural and functional spectrum of ductus arteriosus abnormalities.

BACKGROUND

The ductus arteriosus (DA) ensures that oxygenated blood from the placenta is circulated effectively to all fetal organs. High levels of prostaglandins, particularly PGE2, maintain the patency of the DA in utero. However, during the third trimester, the DA becomes increasingly sensitive to constricting factors like prostaglandin inhibitors.

METHOD

A retrospective single-center review of 44 fetuses with abnormal ductal morphology in the late third trimester over 6 years was performed. “The ‘V-sign’, formed by convergence of the ductal and aortic arches toward the descending aorta, was assessed on the axial 3VV/3VTV sweep and correlated with colour and spectral Doppler findings, right ventricular changes, and perinatal outcomes.”

CASE CLASSIFICATION

18	3	19	4
Tortuous ductus	Aneurysmal dilatation	Ductal constriction	Functional closure
Cases were classified as tortuous ductus (n=18), aneurysmal dilatation (n=3), ductal constriction (n=19), or functional closure (n=4).			

OBSERVATION & RESULTS

The spectrum of ductal arteriosus (DA) abnormalities ranged from:

- Tortuosity, characterised by distortion of “V” shape into “S” or “C”;
- Aneurysmal dilatation, characterised by asymmetric focal left-sided bulging;
- Constriction, characterised by narrowing at the tip of the “V”, increased flow velocities, and right ventricular overload;
- Functional Closure, the most severe form, characterised by near-disappearance of one limb of the “V” and absence of forward flow, best appreciated dynamically (video clip attached).

Right ventricular overload occurred in 20.5% of cases.

All closure cases required immediate delivery.

NICU admission rate was 18.2%, with one neonatal death due to pulmonary hypertension.

“V-SIGN”: IMAGES FROM ISUOG PRACTICE GUIDELINES (UPDATED) - FETAL CARDIAC SCREENING

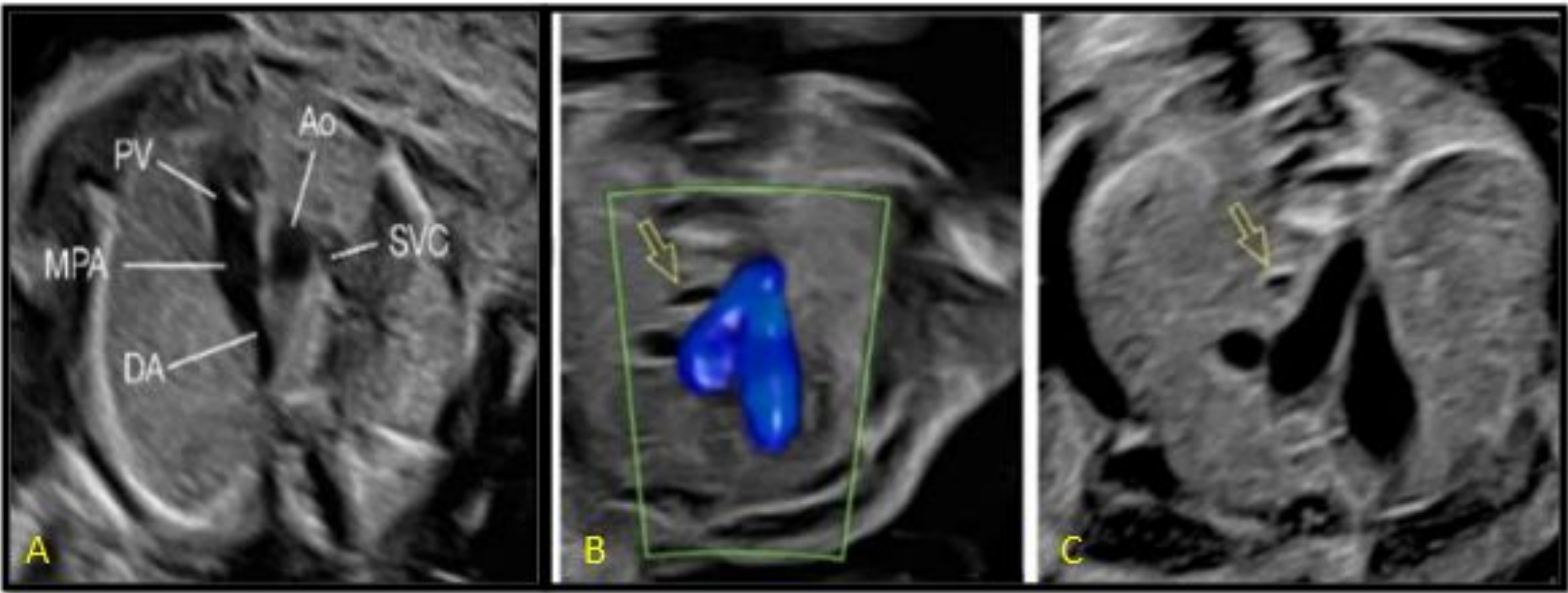
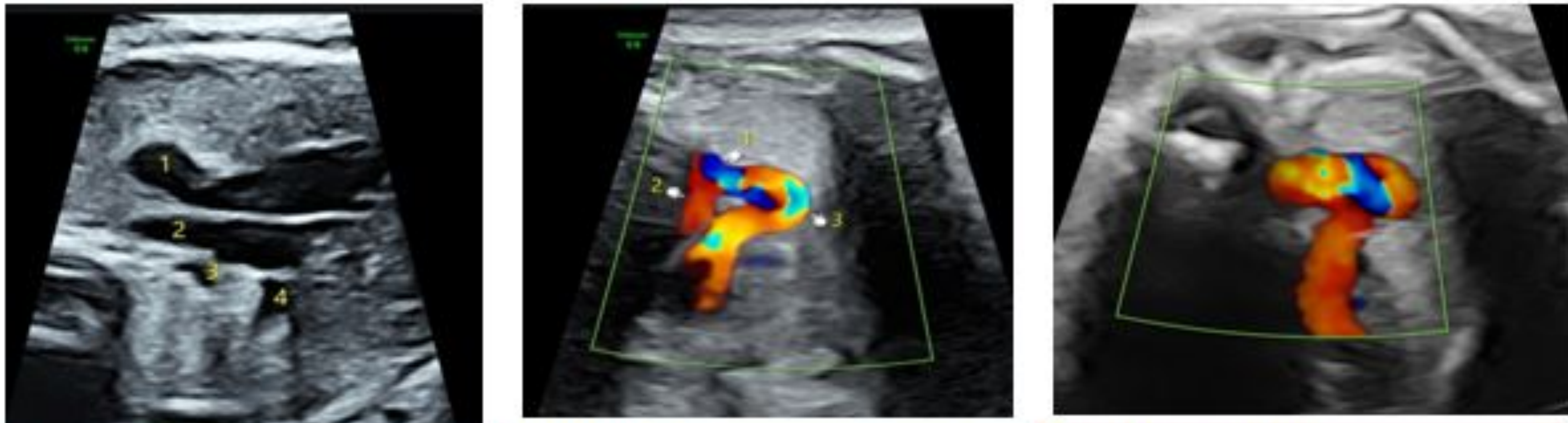
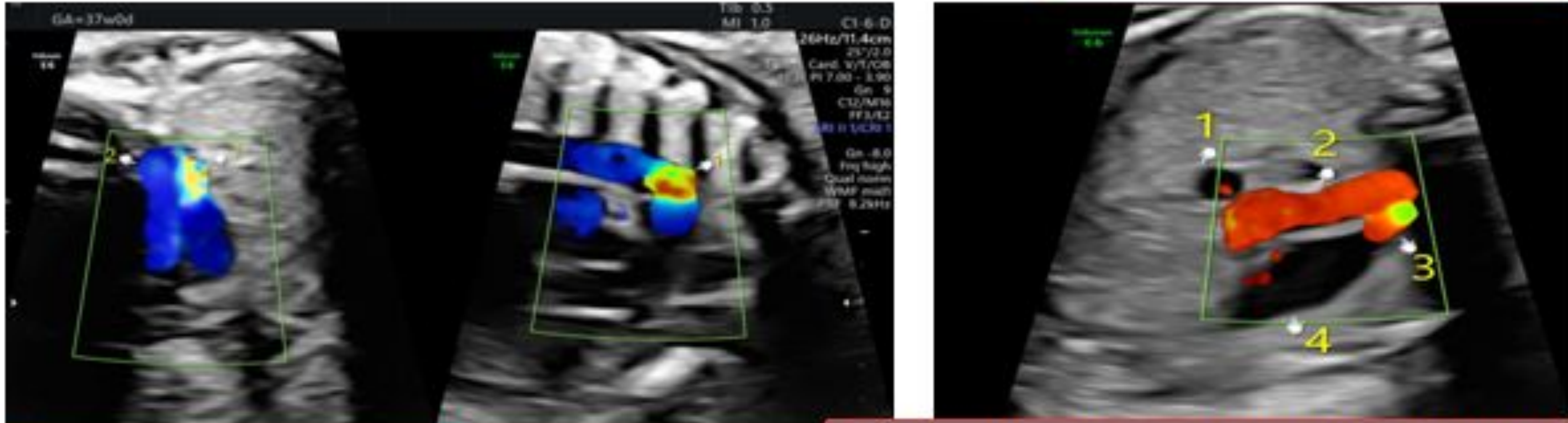


Figure 1 : (A)- Isuog fig.8d. Three-vessel view with posterior spine. Left-sided limb of “V-sign” is formed by the ductus arteriosus(DA) and continuation of the main pulmonary artery. Right sided limb by ascending aorta; (B) & (C): Vertically flipped Isuog. Fig. 9c and 9b: three- vessel-and-trachea-view with anterior spine. The left-sided limb is formed by the DA, and the right-sided limb by the transverse aortic arch (Ao). Fig. (B) shows both limbs in the same color and of nearly the same width; the tip of the “V” is to the left of the spine and trachea(arrow), to the right of the Ao. Fig. (C) is the same as Fig. (B) in grayscale.

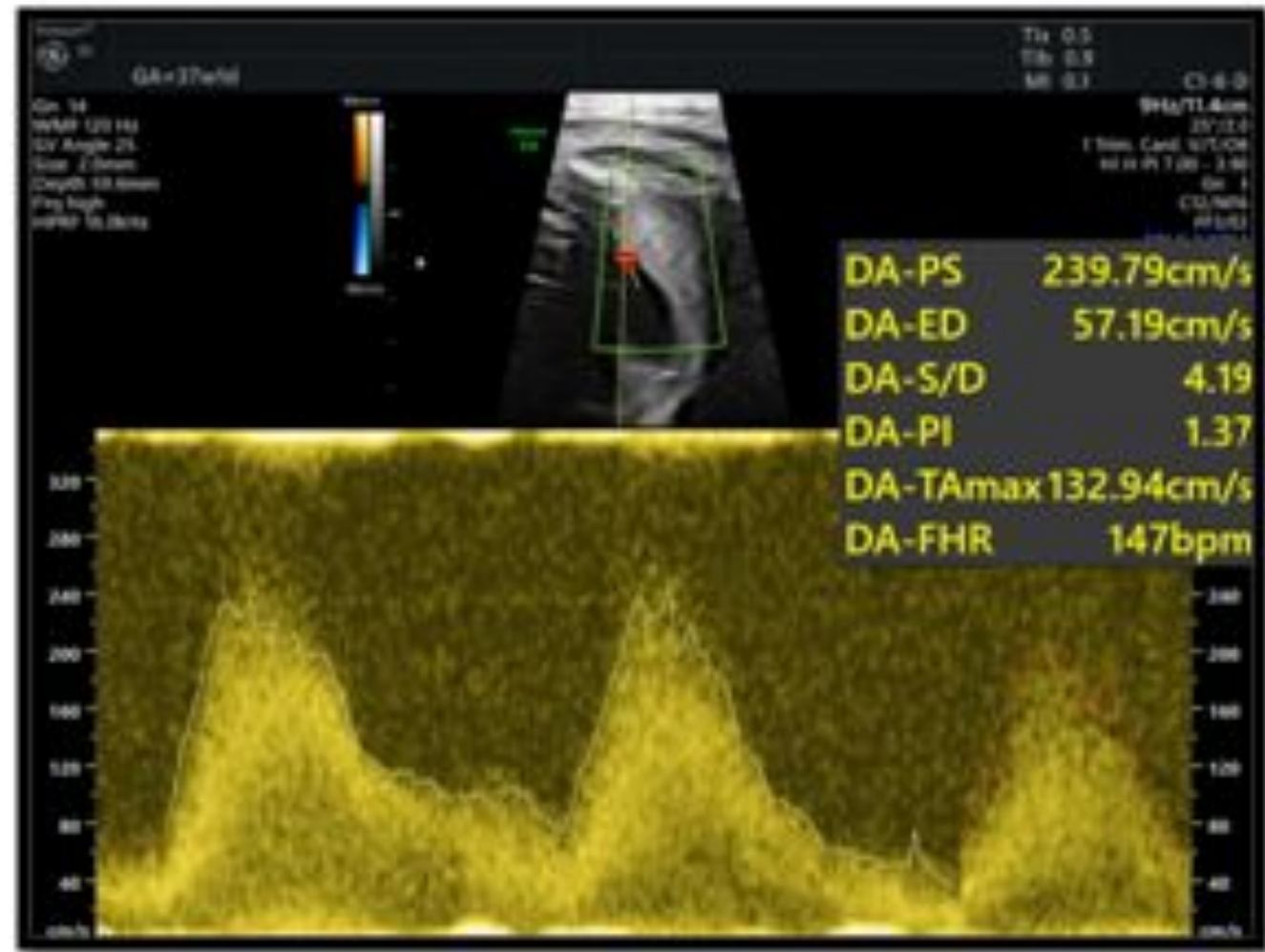
IMAGING FEATURES OF DA ABNORMALITIES ON 3VV/3VTV



3VTV,Rt. Posterior spine. Distortion of “V-sign” (1.DA 2.Ao 3.Trachea 4. SVC)
3VTV,Rt. Anterior spine 1. Aortic end of DA 2.Ao arch 3.tortuous, S-shaped DA, distortion of “V-sign.” Turbulent flow
Rt. Anterior spine Aneurysmal dilatation of DA(10mm in diameter),focal saccular leftward bulge. Swirling/ bidirectional flow



Rt. anterior spine 3VV on Color Doppler Aliasing at aortic end of DA(1) Ductal constriction
Sagittal Ductal arch confirming aliasing at narrowed DA(1)
Left anterior spine.1. SVC 2.trachea,3.Aortic end of DAwith narrowing, aliasing, absent forward flow. 4. Funneling of the DA and Main Pulmonary Artery(MPA) Flow void in MPA- Functional Ductal Closure



Pulsed Doppler at the site of Ductal Constriction fulfilling all three criteria
1. PSV>140cm/sec
2. EDV>35cm/sec
3. PI<1.9

DISCUSSION

Late third-trimester assessment of the ductus arteriosus can be technically challenging because sagittal ductal arch imaging is often limited by fetal position, reduced fetal mobility, an engaged head, oligohydramnios, and an unfavourable spinal position. In this setting, the axial three-vessel view (3VV) with cranial extension into 3VTV provides a practical alternative for evaluating ductal morphology and haemodynamics.

Progressive distortion or disappearance of the normal “V-sign” on 3VV may indicate a spectrum of ductal abnormalities, from tortuosity and aneurysmal dilatation to constriction and functional closure.

CONCLUSION / KEY MESSAGE

A simple, position-independent assessment of the ductus in late gestation may enable earlier recognition of clinically significant disease and support timely perinatal decision-making.

LIMITATIONS

- Retrospective, single-centre study.
- Sagittal ductal arch correlation was not feasible in all late-gestation cases.
- Postnatal echocardiographic correlation was limited.

REFERENCES

- Jackson CM, Sandor GGS, Lim K, et al. Diagnosis of fetal ductus arteriosus aneurysm: importance of the three-vessel view. Ultrasound Obstet Gynecol. 2005;26:57–62.
- Carvalho JS, et al. ISUOG Practice Guidelines (updated): fetal cardiac screening. Ultrasound Obstet Gynecol. 2023;61:788–803.
- Oztunc F, et al. Prenatal Diagnosis of Ductus Arteriosus Anomalies: A Single-Center Study. Pediatr Cardiol. 2024;45:600–604.

Video clip of Functional ductal closure attached.