

First-trimester fetal echocardiography: efficacy in early detection of major structural heart abnormalities compared to second trimester

Early doesn't mean inaccurate — 90.8% first-trimester concordance with second-trimester assessment for major CHD.

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90.8%

Concordant diagnosis

95% CI 82–95%

OBJECTIVE

To compare the detection of **major structural heart abnormalities** in **first trimester** and **second trimester** fetal echocardiography.

METHODS

- **Prospective observational study** — single tertiary fetal-medicine **referral centre**, Chhattisgarh, India
- **76 singleton pregnancies**; first- and second-trimester fetal echocardiography
- **Single observer**; all standard views per **ISUOG protocol**
- **GE Voluson E8**, grayscale + HD power Doppler
- **Descriptive statistics & chi-squared testing** (SPSS v21.0)
- **Reference standard**: second-trimester scan (19–24 wk) + **postnatal confirmation**

CONCORDANCE FLOW (n = 76)



9.2%

Discordance

RESULTS

- **90.8% agreement** between first- and second-trimester findings
- **9.2% discordance** — evolving lesions (coarctation, outflow stenosis)
- **RVOT** most frequently suspected in first trimester (9.2% vs 2.6%)
- **Later gestation improved** outflow/great-vessel visualisation (**LVOT p = 0.031**; **3VV & 3VTV p = 0.016**)
- Final CHD prevalence **2.63%**

DISCUSSION

- **90.8% concordance** echoes **Rithey et al. (2024, 92.9%)** — first-trimester echo reliably flags major CHD.
- **Discordance isn't failure** — evolving lesions demand serial imaging.
- **Early triages, not replaces** — **second-trimester confirmation** (ISUOG/SMFM) essential; resolution and fetal position limit views.
- **Pair with genetics**: **CMA first-line**, **22q11.2** for outflow defects.

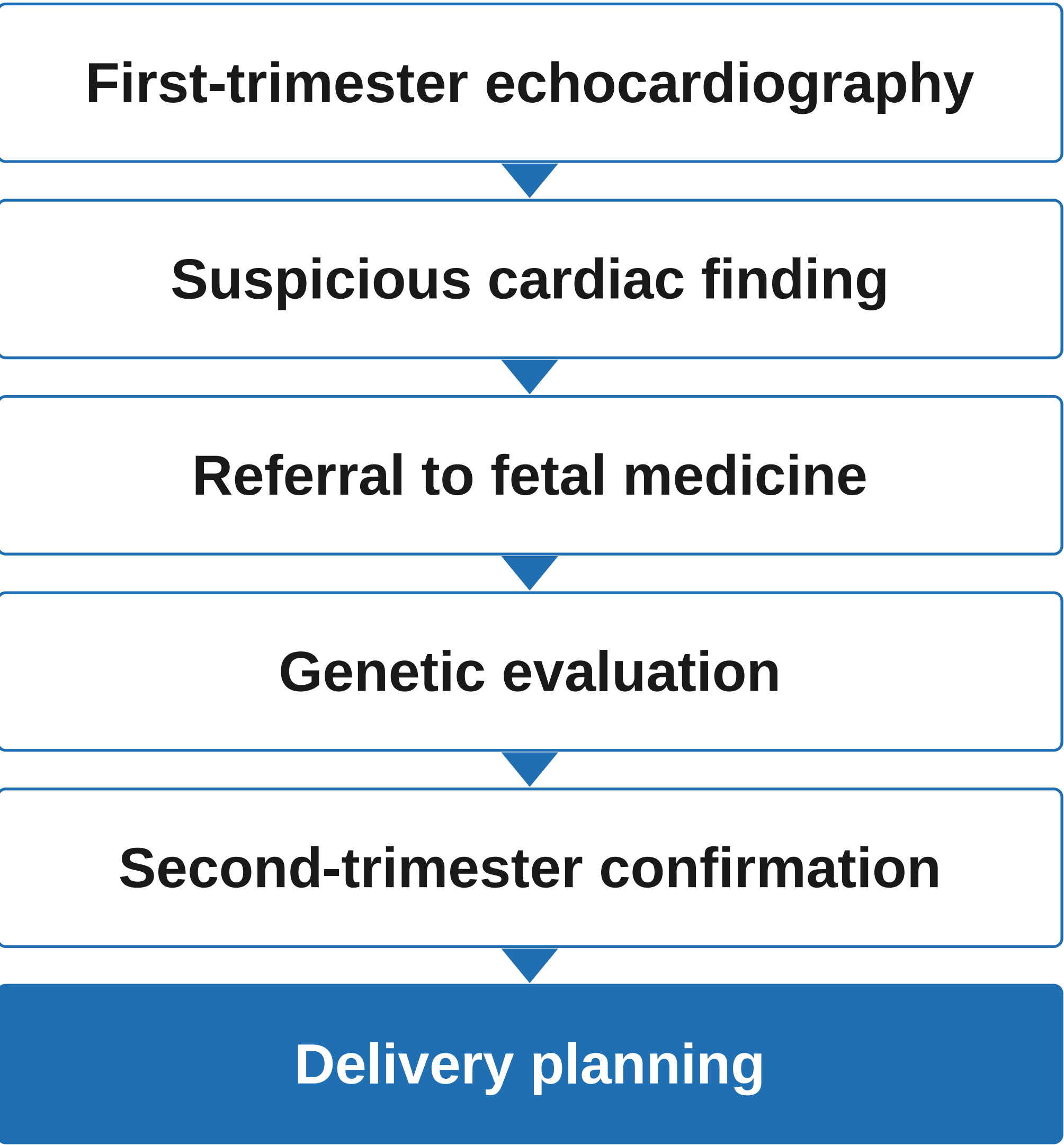
2.63%

Confirmed CHD

76

Prospective pregnancies

CLINICAL PATHWAY



KEY MESSAGE

First-trimester fetal echocardiography shows high concordance with second-trimester assessment for major CHD and can triage disease months earlier — while flagging the small subset of evolving lesions that require repeat evaluation. Incorporating it into specialised screening pathways may enable earlier multidisciplinary counselling, without replacing the diagnostic role of the second-trimester scan.



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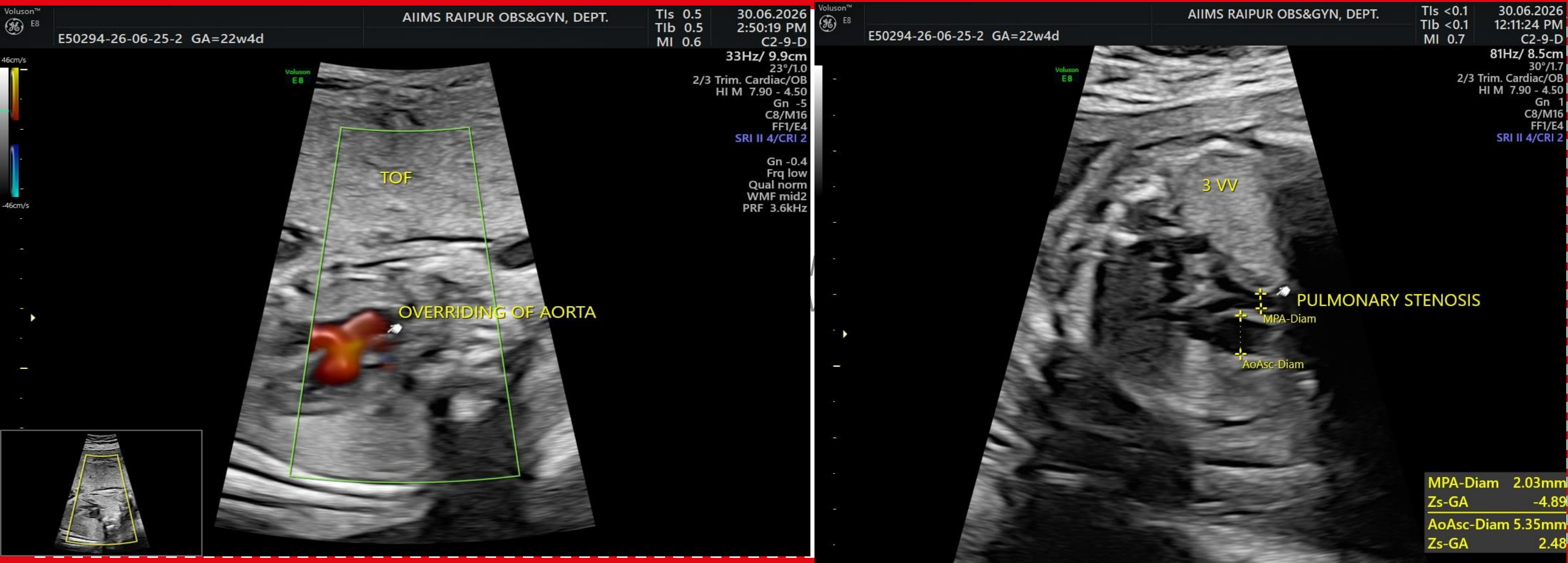


Figure 1. Tetralogy of Fallot: VSD with overriding aorta and pulmonary outflow tract obstruction.

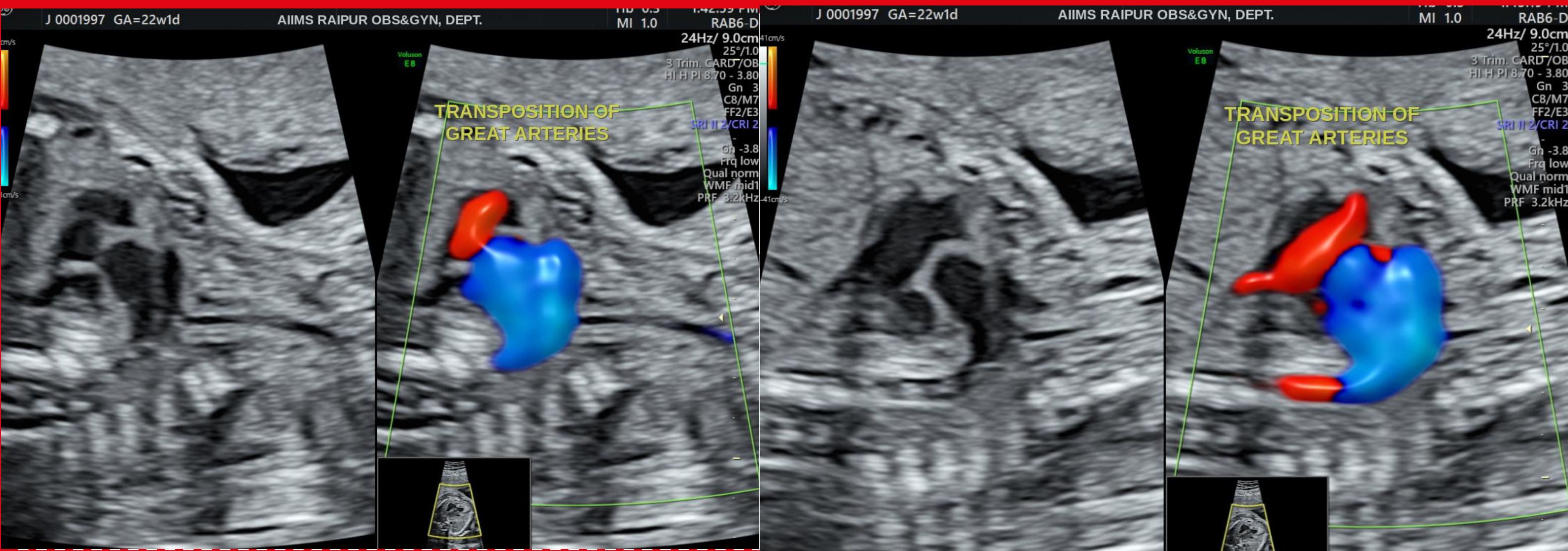


Figure 2. Transposition of the Great Arteries: Abnormal ventriculoarterial concordance with parallel orientation of the great arteries.

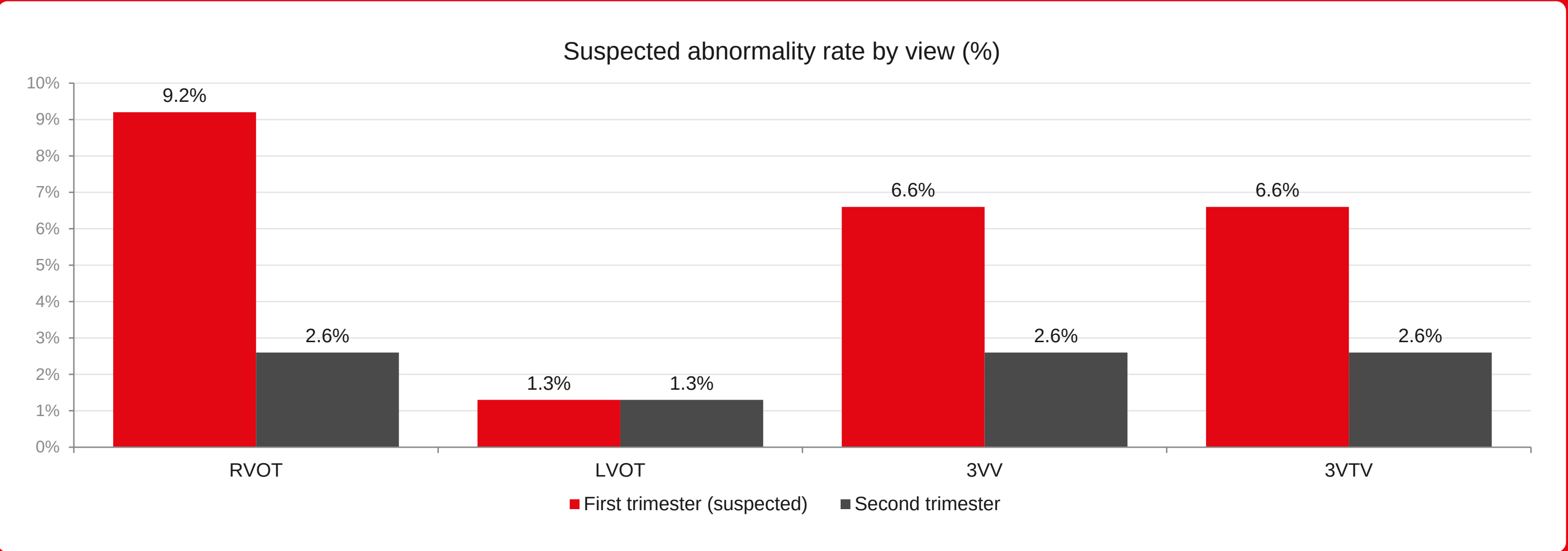


Figure 3. First- vs second-trimester suspected rates by view (n = 76).

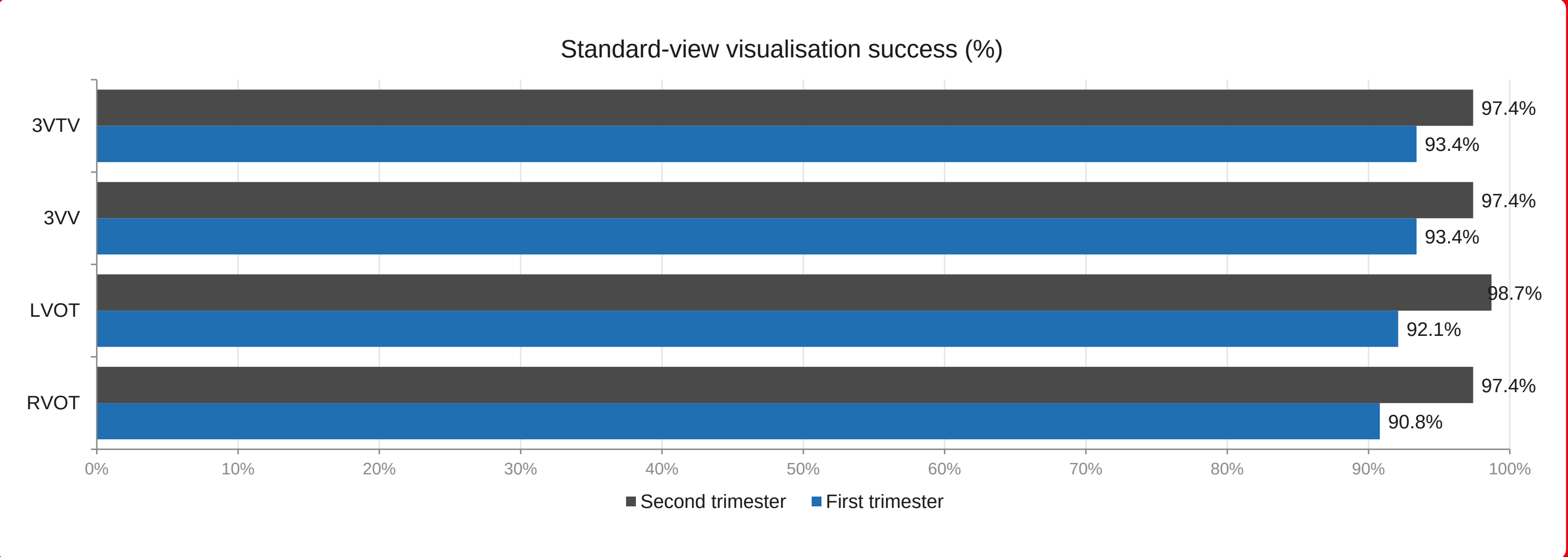


Figure 4. Standard-view visualisation success, first vs second trimester (n = 76).