

Detection of the "3VT View" using 3D Ultrasound Volumes Acquired at the Level of the "4CV"

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Objective: The four-chamber view (4CV) detects about 30% of major cardiac anomalies. Adding the outflow tract and the three-vessel trachea view (3VT) improve the detection of cardiac anomalies. 3-Dimensional ultrasound (3DUS) is more available than 4-Dimensional ultrasound for cardiac examinations. The aim of this study is to investigate the ability to demonstrate the 3VT of the fetal heart with 3DUS, and to test the reliability of the measurements of the arches.

Methods: Prospective study of normal fetal heart volumes, acquired at the second trimester of gestation by 3DUS with color Doppler. Post processing off line manipulation of the volumes to demonstrate the 3VT view by two expert sonologists. The "V" shape of the arches, the color of flow and the place of the trachea and superior vena cava were evaluated. Measurements of the aortic- and ductal-arch diameter were calculated and compared to the value from literature of 2-Dimension ultrasound. Intra- and inter-observer variability was calculated.

Results: 31 healthy patients with normal fetuses by anomaly scan were evaluated prospectively. Mean gestational age was 22w6d (range 19w4d-25w0d). Navigation in the cephalic direction revealed the 3VT view in 87-90% by the two reviewers. Mean and 95CI diameter of the aortic and pulmonary arteries are presented in table 1. The estimated time for volume acquisition and manipulation in the A plane is about 60 seconds.

Conclusion: Combination of basic knowledge of 3DUS and demonstration of 4CV allows extension of the cardiac examination to the 3VT view in about 90% of cases. Information of the number of vessels, shape, diameter, flow direction and the relation of the two arches is collected with simple sonographic method.

Gestational week	Reviewer 1	Reviewer 1	Reviewer 2	Reviewer 2
	Aorta Diameter Mean (CI 95%)	Pulmonary Diameter Mean (CI 95%)	Aorta Diameter Mean (CI 95%)	Pulmonary Diameter Mean (CI 95%)
19-20	3.05 (1.2-4.8)	3.07 (2.7-3.9)	3.85 (2.7-4.9)	3.67 (3.0-4.3)
21-22	3.25 (2.6-3.8)	3.37 (2.8-3.9)	4.23 (3.8-4.6)	4.14 (3.8-4.4)
23-24	4.12 (3.4-4.7)	3.70 (3.1-4.3)	4.42 (3.6-5.2)	4.32 (3.6-4.9)

