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TITLE: Fetal atrioventricular time intervals assessed by three different pulsed-wave Doppler methods

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ABSTRACT BODY:

Objectives: To establish normal reference values for the fetal atrioventricular (AV) time interval (mechanical PR interval) assessed by pulsed-wave Doppler (PD) using three different techniques: left ventricular inflow and outflow tracts (LV in/out), superior vena cava and ascending aorta (SVC/AA), and pulmonary artery and pulmonary vein (PA/PV).

Methods: A cross-sectional prospective study was performed in 311 normal singleton pregnant women divided into 5 groups between 16 and 38 weeks' gestation. PD-derived AV intervals were measured from simultaneous interrogation of flow in LV in/out, SVC/AA, and PA/PV. Linear regression analyses were performed to examine correlations with gestational age (GA) and fetal heart rate (FHR). Rates of successful attempts and intraclass correlation coefficients (ICC) for reproducibility of each method were compared.

Results: Fetal AV interval measurements were feasible by LV in/out, SVC/AA, and PA/PV in 100%, 95%, and 95.3% of examinations, respectively. PA/PV revealed the longest AV time intervals in every GA group ($P < 0.001$). The AV intervals in all methods were positively correlated with GA ($R^2 = 0.20\text{-}0.36$; $P < 0.001$) but negatively correlated with FHR ($R^2 = 0.09\text{-}0.19$; $P < 0.001$). The PA/PV time intervals demonstrated the strongest GA dependence. The SCV/AA approach had the least influence of FHR on AV time intervals. For LV in/out, SVC/AA, and PA/PV, intra-observer (ICC = 0.81, 0.85, and 0.83, respectively) and inter-observer (ICC = 0.80, 0.81, and 0.91, respectively) reliability coefficients showed excellent agreements.

Conclusions: This study has established GA-specific nomograms of fetal AV time intervals using three distinct PD techniques. All PD-derived AV time intervals increased with advancing GA and decreased with increasing FHR. Fetal AV interval measurements can be obtained in a clinically viable fashion, with excellent reproducibility, using LV in/out, SVC/AA, or PA/PV approaches.

Additional details

KEYWORDS: Echocardiography, Fetal heart, Doppler ultrasound.

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Supplemental Data 1: Table and Pic_ISUOG.pdf

Supplemental Data 2: (none)

Supplemental Data 3: (none)

Supplemental Data 4: (none)

Supplemental Data 5: (none)