

The Utility of Aortic Doppler Ultrasound Measurements in the Parasternal Long Axis View

Stephanie A. Guarino, Jennifer M. Masiddo, Peter A. Hosick, Evan L. Matthews. Montclair State University, Montclair, NJ

Doppler based cardiac stroke volume measurements require a parallel angle between the flow of blood and the ultrasound probe necessitating apical cardiac views to obtain accurate absolute values. However, apical cardiac views are technically challenging during long serial recordings. Parasternal views are less challenging, but do not provide a parallel angle to the aorta. If a relationship exists between the aortic Doppler measurements from these two cardiac windows then a regression calculation can be established to estimate stroke volume from the parasternal view. **PURPOSE:** To determine if a relationship exists between Doppler measurements made at the aorta in the parasternal long axis and apical three chamber echocardiographic views. **METHODS:** Healthy college age participants underwent Doppler ultrasound measurements at the aorta in the parasternal long axis and apical three chamber view. Linear cross sectional analysis was performed to assess aortic annulus area and Teichholz stroke volume estimates in the parasternal long axis. Only participants with complete data sets are included in this analysis. Bivariate correlations were performed between the parasternal and apical Doppler measurements. Correlations and paired t-tests were performed between parasternal Doppler and Teichholz stroke volume estimates. **RESULTS:** Of the 18 participants studied, only 12 (66.7%; 6 males, 6 females, age 25.5 ± 1.1 yrs, height 156 ± 14.2 cm, weight 69.8 ± 4.5 kg, body fat $20.6 \pm 2\%$) had adequate Doppler strength in parasternal long axis for software automated signal tracing. No relationship was found between the time averaged mean blood flow velocity measurements obtained in the parasternal long axis and apical three chamber views ($r = -0.216$, $p = 0.498$). Parasternal long axis Doppler based stroke volume (25.9 ± 4.9 mL/beat) measurements were lower than parasternal long axis Teichholz estimated stroke volume (57.8 ± 4.9 mL/beat) measurements ($p < 0.001$), with no correlation between the two ($r = 0.402$, $p = 0.190$). **CONCLUSION:** While this data is preliminary, it suggests that aortic Doppler measurements in the parasternal long axis view suffer from low Doppler signal strength, and are inaccurate when compared to more conventional measurements.