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SELECTED ABSTRACTS

How age and gender affect hemodynamic forces in healthy subjects

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Aim: noninvasive echocardiographic analysis of blood-tissue interaction has recently been made possible by a sophisticated mathematical model. This model uses speckle-tracking technology to estimate instantaneous intraventricular gradients (IVPGs), which are represented as hemodynamic forces (HDFs). The aim of the present study is to examine how HDFs are affected by gender and age, providing reference value.

Methods: 85 healthy subjects were recruited and underwent transthoracic echocardiography. Speckle-tracking analysis was performed from the three apical views, and the mitral annulus and left ventricular outflow tract were measured to compute HDFs. Longitudinal HDFs have been examined, decomposing them in amplitude and time parameters.

Results: study population showed a median age of 47[25-60] years and 53% were female.

Female patients showed lower LVMi (60.1±11.8 mg/m^2 vs. 71.4±16.8 mg/m^2, p=0.001), lower LVEDV (84.6±14.6 ml vs. 108±20.7 ml, p<0.001), and a lower E/e' (7.26[6.47;7.78] vs. 5.31 [4.77;6.30], p<0.001). Nor systolic nor diastolic blood pressure differed between male and female patients (p NS for both). Several time parameters differed between gender: female subjects had a later systolic deceleration peak (38.7±4.21% vs. 34.8±4.31%, p<0.001) and a later diastolic deceleration peak (60.9±7.64% vs. 56.5±8.39%, p=0.015). No amplitude HDFs parameter was found to differ between gender (p NS for all).

Regarding age, patients over50 years showed higher systolic (124±15.4 mmHg vs. 115±10.8 mmHg, p=0.008) and diastolic (75.2±8.99 mmHg vs. 69.8±7.16 mmHg, p=0.005) blood pressure, and higher E/e' (7.41[6.91;8.58] vs. 5.58[4.81;6.56], p<0.001). HDFs time variables differed between patients under and over50 years: systolic ejection duration was longer in over50-group (27.8±3.44% vs. 25.6±3.48%, p=0.005), systolic deceleration duration was shorter in over50-group (7.69±1.48% vs. 8.54±1.97%, p=0.025) and systolic acceleration peak was earlier in over50-group (13.5±2.46% vs. 14.8±2.59%, p=0.020).

Conclusion: Among healthy subjects, female patients showed later systolic deceleration peak and later diastolic deceleration peak. Subjects over50 years showed longer systolic ejection duration, shorter systolic deceleration duration and earlier systolic acceleration peak.