Imaging Techniques

7.2 Mitral E Wave Deceleration Time to Peak E Velocity Ratio and Cardiovascular Outcome in Hypertensive Patients during Anti-Hypertensive Treatment: the Life Study

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Introduction. Early mitral flow deceleration time (DTE) is a prognostically validated marker of LV chamber stiffness. However, for any given LV stiffness, a higher E peak velocity (pE) is associated with longer DTE, suggesting that the prognostic relevance of DTE might be influenced by variations in cardiac preload (i.e. during anti-hypertensive treatment). It is not known whether normalization of deceleration time for E-velocity (DTE/pE) might be a more stable diastolic index for prediction of incident cardiovascular (CV) events in hypertensive patients during treatment, as compared to DTE.

Methods. We evaluated 770 hypertensive patients (66±7 years; 42% women) with ECG-LV hypertrophy enrolled in the LIFE echo-substudy. Prognostic value of basal DTE/pE in predicting combined fatal and non-fatal CV events was preliminarily evaluated. Echocardiographic exams were performed annually for 5 years during anti-hypertensive treatment and variation of DTE/pE and of DTE over time were evaluated in relation to incident CV events.

Results. During follow-up, 69 CV events occurred (9% of study population). Mean basal DTE/pE was $3.55 \pm 1.55 \text{ sec}^2/\text{cm} \cdot 10^{-3}$. In univariate analysis baseline DTE/pE was positively associated with age ($r=0.10$; $p<0.01$), relative wall thickness ($r=0.13$; $p<0.01$) and isovolumic relaxation time ($r=0.26$; $p<0.001$) and negatively with heart rate ($r=-0.20$; $p<0.001$); with no association found for systolic/diastolic blood pressure, LV mass or ejection fraction (all $p=NS$). Unadjusted Cox regression showed a positive association between basal DTE/pE and CV events [(HR=1.21 (95%CI = 1.07-1.37); $p=0.002$]. In time-varying Cox model, independently of age, gender, type of anti-hypertensive treatment and in-treatment heart rate variation, higher in-treatment DTE/pE was associated with higher rate of CV events [(HR=1.26 (95%CI = 1.04-1.80); $p<0.026$], with no association found for in-treatment DTE ($p=NS$).

Conclusions. In our population of treated hypertensive patients with ECG-LV hypertrophy, the ratio of in-treatment DTE/pE, but not DTE alone, independently predicted future CV events. In high-risk hypertensive patients, normalization of DTE for pE might be preferred to DTE in evaluating diastolic function during anti-hypertensive treatment.