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Forgotten and neglected: LV hypertrophy and LV remodeling as important predictors in patients with mitral valve prolapse

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Current ESC guidelines recommends left ventricular (LV) end-systolic diameter (ESD), LV ejection fraction (LV EF), systolic pulmonary arterial pressure (SPAP) as key parameters in a multifactorial treatment algorithm for chronic severe primary MR. However, LV hypertrophy (LVH) and LV remodelling during the process of adaptation to chronic MR can influence further clinical course.

Aim: of this study was to test whether LVH and distinctive LV geometry are coupled with increased risk for heart failure (HF) development and occurrence of major adverse cardiac event (MACE) among patients with MVP and can they improve power of statistical models for HF and MACE prediction based on parameters supported by the current guidelines.

Methods: 376 pts diagnosed with mitral valve prolapse (MVP) between 1. January 2014. and 31. December 2017 and with complete medical chart and follow-up data from central echo laboratory in the tertiary health center were enrolled in the study. Four types of LV geometry were identified: Type 1 (normal LV mass with normal geometry), Type 2 (normal LV mass with concentric remodeling), Type 3 (eccentric hypertrophy) and Type 4 (concentric hypertrophy). The primary outcome was HF and secondary outcome was MACE (HF development, myocardial infarction, myocardial revascularisation (both PCI and/or ACBG) and cardiac death).

Results: The distribution of patients was as follow: 51.2% (Group 1) vs 3.3% (Group 2) vs 41.4 % (Group 3) vs 4.1% (Group 4). In multivariable model the highest OR for HF development after adjustment for age, ESD and LVH, had concentric LVH (OR= 5.361, p= 0.004, 95% CI 1.696-16.648), then EF < 60% (OR= 3.025, p = 0.004, 95% CI 1.427-6.411) and the lowest OR had SPAP > 40 mmHg (OR = 2.274, p = 0.039, 95% 1.43-4.958). Adding LVH significantly increased model's power to predict HF above traditional parameters (Chi-square from 19.386 to 23.640, p < 0.001; Nagelkerke R square from 0.090 to 0.110), whereas addition of LV geometry increased it even more (Chi-square from 23.640 to 28.729, p < 0.001; Negelkerke R square from 0.110 to 0.132). Independent MACE predictors in multivariable model were: EF < 60% (OR 3.645, p < 0.001, 95% CI 1.808- 7.50), new onset atrial fibrillation during the follow-up (OR =3.327, p = 0.012, 95% CI 0.305-8.484), concentric LVH (OR= 4.241, p = 0.015, 95% CI 1.327-13.550) and normal LV geometry without LVH (OR= 0.514, p = 0.002, 95% CI 0.288-0.918), even after adjustment for MV surgery. Adding LVH significantly improved model's power (Chi-square from 29.026 to 35.112, p < 0.001; Nagelkerke R square 0.121 to 0.146) to predict MACE and addition of type of LV geometry provided additional strength (Chi-square from 35.112 to 39.707, p < 0.001; Nagelkerke R square from 0.146 to 0.164).

Conclusion: LVH and especially concentric LVH are independent predictors of heart failure development and MACE in mitral valve prolapse and significantly improves predictive powers of the models based on traditional parameters.