

Predictors of Clinically Significant Atrial Fibrillation in the NHLBI Hypertrophic Cardiomyopathy Registry (HCMR)

Background: Atrial fibrillation (AF) is a common morbidity associated with hypertrophic cardiomyopathy (HCM). Prior studies have focused on AF incidence. In HCMR, we have focused on predictors of clinically significant AF episodes defined as; 1) requiring electrical cardioversion or catheter ablation 2) requiring hospitalization >24 hours 3) clinical decision to accept permanent AF in patients previously in sinus rhythm.

Methods: 2755 patients were recruited (44 sites in 6 countries) and underwent a questionnaire, cardiac magnetic resonance imaging (CMR), and blood draw for biomarker and genetic analysis. 77 (2.8%) had persistent AF and were excluded. Clinically significant AF episodes were defined as above. Predictive mean matching (PMM) was used to impute missing values for continuous variables. Penalized regression via elastic-net methodology was used to identify the most important predictors of AF out of 36 variables examined. The Cox model for competing risks (death) was used to analyze time to AF. Hazard ratios (HR) were expressed in units of 10.

Results: 2,664 (99.5%) of the 2,678 remaining patients had valid follow-up data. There were 90 AF events among 82 patients: 77 with 1 event, 2 with 2, and 3 with 3 events. Based on elastic-net results, LA volume, age, left ventricular (LV) mass, NYHA class, stroke, dyspnea, Type II diabetes, reverse curvature morphology, contractile and reservoir percent were included in the initial model. The most parsimonious model included LA volume (HR 1.13, 95% CI 1.09-1.18), age (HR 1.61, 95% CI 1.23-2.11), contractile percent (HR 0.83, 95% CI 0.73-0.95) and reservoir percent (HR 0.80, 95% CI 0.67-0.97).

Conclusions: Predictors of clinically significant AF events in patients with HCM include age and LA volume and contractility. Left atrial size and function are critical predictors of clinically significant AF in HCM. Next steps will be to develop and validate an algorithm based on these variables that would predict future clinically significant AF in HCM patients.