Manuscript #497

1. Title: Left ventricular hypertrophy and cardiac autonomic control - The ARIC Study
   Abbreviated: LVH and HRV

2. Writing Group:
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3. Timeline:
   Submit Proposal to Publications Committee 8/1/97
   Complete analysis 11/1/97
   Submit first draft to Publications Committee 2/11/98
   Submit to Journal 4/1/98

4. Rationale:
   It has been consistently shown in the literature that beat-to-beat heart rate variability (HRV) is a simple and valid, non-invasive measure of cardiac autonomic function. Our previous work has demonstrated a significant relationship of lower HRV to the development of CHD and hypertension. Left ventricular hypertrophy is considered as an important risk factor of cardiac events. It is biologically plausible that increased ventricular mass, even within the "normal" range, may alter cardiac sympathetic and parasympathetic balance, and thus predispose these individuals at higher risk of cardiac events. Several clinical studies have demonstrated a decrease in HRV (reflective of autonomic imbalance) in patients with hypertensive cardiac hypertrophy. To our knowledge, there is not published population-based study linking increased left ventricular mass and lower HRV in population sample.

   In ARIC Visit 1, two-minute resting, beat-to-beat heart rate data were collected according to a standard protocol. Utilizing Fast Fourier Transformation, spectral analysis were applied to the heart rate data. At present, we have processed HRV data for a stratified random sample (N about 3000) of ARIC Visit 1 participants. From these records, HRV high frequency and low frequency powers (frequency domain measures of HRV) and standard deviation of R-R intervals (time domain SV index) have been calculated as measures of cardiac parasympathetic, sympathetic and sympathovagal
balance. Based on this sample, several HRV manuscripts have been published.

In this manuscript, we propose to extend our investigation to the relationship of autonomic function, as measured by HRV analysis, and left ventricular mass and hypertrophy estimated by several recognized ECG criteria: Casale/Devereux criteria, Cornell voltage criteria, Cornell Product criteria, 12-lead voltage product, sum of 12-lead voltage, Rautaharju criteria, Sokolow-Lyon criteria and Romhilt-Estes criteria.

5. Main Study Questions:
   1. Do individuals with higher left ventricular mass have lower HRV (both frequency and time domains) independent of age, race, sex?
   2. Is the association independent of blood pressure levels, history of hypertension and antihypertensive treatment?
   3. Is the association modified by hypertension status?

6. Data(variables, source, inclusion/exclusion):
Visit 1 variables needed: processed heart rate data, ECG data, height, BMII, demographic variables, and established risk factors of CHD.