ARIC Manuscript Proposal #882 (Revised)

Full Title: Hypertension Control Status and ECG Abnormalities in Women

Abbreviated Title: Hypertension Control and ECG Abnormalities

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Timeline:
Obtain data set: Oct 2002
Begin statistical analysis: Nov 2002
Complete statistical analysis: January 2003
Complete manuscript: March 2003

Rationale:
Although effective antihypertensive treatment – both pharmacologic and non-pharmacologic – is widely available and its proper use guided by well-known and practice-oriented guidelines, the level of blood pressure control among treated hypertensives is consistently found to be sub-optimal. Data from the Third National Health and Nutrition Examination Survey (NHANES III) from 1988-1991 showed that African American women have a higher crude prevalence of hypertension when compared to White women across all age strata,(1) African American women in NHANES III had an age-adjusted prevalence of 31% as compared to 21% in White women.(2) Among those in NHANES III being treated for hypertension, less than 50% of both African American and White women had controlled hypertension.(1) Because of the known association of uncontrolled blood pressure with ischemic heart disease (IHD) and stroke (1, 3), the reported frequency of uncontrolled blood pressure in women being treated for hypertension is a health burden of considerable significance and public health impact.
While the presence of hypertension is known to increase the risk of cardiovascular disease (CVD), it is also important to understand whether inadequate blood pressure control among treated hypertensives contributes to the development of subclinical CVD, as defined by major electrocardiographic (ECG) abnormalities. ECG abnormalities such as ST depression, Q waves, and T waves, are indicative of the presence of IHD; however, little is known about the association between ECG abnormalities and treatment of hypertension, particularly in women. We hypothesize that in women treated for hypertension, uncontrolled hypertension is (directly) associated with the prevalence of ECG abnormalities. We also hypothesize that demographic, socioeconomic, and anthropometric characteristics of African American and white women will be associated with hypertension control status and serve as potential confounding or explanatory factors for the relationship between hypertension control status and ECG abnormalities.

**Hypotheses/Study Questions:**

1) Lack of blood pressure control among treated hypertensive women is associated with the prevalence of major abnormalities on the resting, 12-lead ECG.
   a. Hypertension will be positively associated with the selected set of ECG abnormalities; the POR comparing hypertensives to normotensives will be greater than 1.
   b. Among treated hypertensives, those with blood pressure levels above recommended guideline levels for control will have a higher prevalence of ECG abnormalities than those with controlled hypertension, with a POR greater than 1.
   c. The magnitude of the associations postulated in a and b (above) will be greater for African American women than White women.

2) Demographic, socioeconomic, and anthropometric characteristics will differ by blood pressure control status among hypertensive women, offering opportunities to identify potential confounding or explanatory attributes.
   a. Income, educational attainment, and access to medical care as measures of socioeconomic status will be directly (positively) associated with blood pressure control status among treated hypertensive women.
   b. Age will be inversely (negatively) associated with blood pressure control status among treated hypertensive women.
   c. Body mass index (BMI) will be inversely (negatively) associated with blood pressure control status among treated hypertensive women.
   d. After controlling for demographic, socioeconomic, and anthropometric characteristics, differences between PORs for White and African American women will decrease.

**Dependent variable(s):** Dependent variables are the following ECG abnormalities coded by the Minnesota Code: major and minor ST depression, ST elevation, major and minor T waves, minor Q waves, and left ventricular hypertrophy (LVH). ECG data from Visit 1 will be studied.
Main independent variable(s): Blood pressure will be categorized as hypertension and normal blood pressure. Hypertension will include persons, both treated and untreated, with isolated systolic hypertension, isolated diastolic hypertension, systolic-diastolic hypertension, and those with hypertension controlled with anti-hypertensives. Blood pressure thresholds and levels of control will be those designated by JNC-VI.(8) Blood pressure data from Visit 1 will be studied.

Covariables: Educational attainment and income will serve as measures of socioeconomic status; age and BMI will serve as demographic and anthropometric measures, respectively. These socioeconomic, demographic, and anthropometric measures will be used as potential explanatory factors for differences in prevalence odds ratios (PORs) between controlled and uncontrolled hypertensives on medication. Study center will be considered in the analyses as a potential confounding factor. Measurement of these variables at Visit 1 will be studied.

References: