Manuscript #133

1. Title:
Serum Enzyme Elevations as Predictors of Mortality after Acute Myocardial Infarction

2. Writing Group:
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3. Timeline:
Analysis based on surveillance data can begin on the 1987/88 data.

4. Hypothesis:
Increased peak serum enzyme levels

5. Rationale:
Extreme elevations of serum enzymes have been found to predict in-hospital mortality during the acute phase of MI independently in some studies but not in others. The original findings implicated CK but during the 1980's a series of analyses by Herlitz and co-workers suggested that peak LDH elevations more accurately predicted outcome. The role of elevated CK-MB remains to be elucidated, in particular that of the presence of MB, the myocardial fraction, unaccompanied by total CK elevation. Available data on over 1000 acute MI's covering 1987 and 1988 and on in-hospital death should render the analysis possible. Once mortality data become available, the analysis will be extended to one-year mortality in hospital survivors of acute MI.

6. Data:
In order to estimate the role of serum enzyme elevation on outcome during or shortly after acute MI, data are required for upper bounds of enzyme ranges in the different hospitals, as well as for clinical and historical variables putatively affecting prognosis. Some of these data are available in the ARIC surveillance database. Age adjusted mortality rates will be calculated in categories of elevation (1.5 to 2x upper normal limit, 2-4x upper limit, etc.) for each of the different enzymes. For estimation of the contribution of enzyme elevation to mortality risk, one alternative would be to consider absolute elevations beyond the upper limit. Another is to categorize the extent of elevation beyond normal levels (see above) and treat the elevation as a categorical variable. A univariate logistic analysis will be calculated to estimate odds ratios associated with specific degrees of serum cardiac enzyme elevation. Then through a multiple logistic function estimated age- and covariate-adjusted odd ratios will be calculated, the covariates being gender, race, type of hospital, history of MI, CVA, congestive heart failure and other variables reflecting clinical severity. The odds ratios for mortality associated with enzyme elevations will be compared to those associated with well-recognized predictive measures such as infarct location and the presence of congestive heart failure.

Individuals with fewer than three enzyme level recordings will be excluded from the analysis. For LDH, measurements over at least 48 hours will be required. Most patients lacking three enzyme level
measurements may represent early deaths in patients before blood could be drawn. Mortality and a number of other attributes (age, gender, etc.) among excluded patients will be compared to those patients for whom adequate serum enzyme measurements are available.

It is recommended to analyze the data for each ARIC community and pool by Mantel-Haenszel or equivalent methods (in case of a major discrepancy among communities, the center-specific data will also be presented separately).

References:

