Electrocardiography in Women
Taking the Initiative

Peter M. Okin, MD

In the just over 100 years since the first ECG was performed, the ECG has become the most extensively used noninvasive diagnostic and prognostic tool in cardiology. Used both at rest and during provocative exercise, the 12-lead ECG has impressive, if imperfect, utility for rhythm analysis, detection of ischemic and hypertrophic heart disease, and outcome prediction in a variety of clinical settings, with a large body of literature that illustrates and supports these applications. The first observation of gender differences in the ECG was published 85 years ago by Bazett, demonstrating that women have significantly longer QT intervals than men despite having higher heart rates. However, despite a growing body of literature demonstrating significant gender differences in QRS amplitudes and durations, QT intervals than men despite having higher heart rates. However, despite a growing body of literature demonstrating significant gender differences in QRS amplitudes and durations, QT intervals than men despite having higher heart rates.

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Discussion of the possible mechanisms for the gender differences in ECG measures is beyond the scope of this editorial. However, a recent review20 of sex differences in cardiac repolarization provides an extensive discussion of the experimental data and potential gender differences in cellular-level ionic currents and the possible roles played by sex hormones in some of the better-characterized gender differences in cardiac repolarization.

The findings by Rautaharju and colleagues12,13 have important implications and provide direction for future investigation. Despite the widespread misconception that the ECG is of limited utility in women, these studies clearly demonstrate the value of the ECG for risk stratification in women, in particular the strong prognostic value of ECG measures of abnormal repolarization when using threshold criteria derived in women. Taken together with the wealth of information documenting the predictive value of the ECG in men, these findings strongly support the routine clinical application of computer-based ECG measurements for risk stratification in women. The known gender differences in QRS duration and amplitudes raise the question of whether sex-specific criteria for MI or bundle-branch blocks may be indicated to further enhance the predictive value of these ECG variables in women. Additional comparisons of ECG measurements in men and women will be necessary to more clearly delineate true mechanistic differences in ECG variables between men and women from differences that may be attributable to gender differences in left ventricular mass, body size, and composition, with application of these findings to improve accuracy of the ECG in both women and men.

In light of the low cost and widespread availability of the ECG and the increasing economic pressures on the practice of medicine, it is imperative that we continue to improve the diagnostic and prognostic performance of the ECG in women. Now that we have seized the initiative with respect to ECG research in women, we should not let it go to waste.


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