Temporal Variation in T-Wave Alternans in Patients with Acute Myocardial Infarction

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To the Editor:

The study by Oliveira et al.¹ in the April 2007 issue of the *Journal* is interesting and timely considering the current debate on the appropriate time following an acute myocardial infarction (AMI) for implantation of implantable cardioverter-defibrillator (ICD) in patients with decreased left ventricular ejection fraction. T-wave alternans (TWA) assessment in such patients is a complex issue, and it is not expected to be resolved easily. The authors studies 51 patients who had suffered an AMI and had undergone a primary percutaneous coronary intervention; the patients had early and late TWA assessment using a treadmill exercise protocol and spectral analysis of the signal. The investigators concluded that there are temporal changes in TWA occurring in the 6 months following an AMI, and that their findings have implications in the patients' management strategies. The key finding of the study is that there exists a significant discordance of positive, negative, and indeterminate results between the first and second TWA assessments. This, of course may imply an interim change in the electrophysiological status of the patients; however another explanation might be a problem with the reproducibility of the TWA assessment, leading to discordant TWA results in clinically stable patients, whose tests were expected to be concordant in the two TWA evaluations during the first 6 months after an AMI. Recently, it has been speculated that the magnitude of TWA may be T-wave amplitude dependent, and thus it may be advantageous to adjust the measured value of the TWA to the amplitude of the corresponding T-waves, in the form of a TWA index.² Such an action would "correct" the TWA values for the occasional marked changes in the amplitude of the corresponding T-waves, thus rendering *seemingly* discordant to ac-

tual concordant TWA assessments. The above may be of importance in the current climate of speculation that quantitative assessment of TWA may have advantages over and above the qualitative one, employing cutoff values, like the 1.9 μV used in this study. But even in the latter situation, the particular value of measured TWA is the one used to characterize a test as positive or negative, thus making the actual value of measured TWA *important* (e.g., a TWA value of 1.8 μV confers negativity, while a value $\geq 1.9 \mu\text{V}$ confers positivity in the assessment). Is it possible that the discordant TWA assessments between the first and the second TWA testing in this study are due to the changing amplitude of the T-waves in the ECGs of the patients between these two evaluations? The authors could provide an answer to this dilemma, by furnishing information on the measured values of TWA, the corresponding amplitudes of T-waves employed for such measurements, and the influence of adjusting the TWA measurements by the amplitude of T-waves (TWA indexing),² in possibly altering their findings. Certainly, spectral analysis of TWA does not reflect only the alternans of the T-wave, but that of the entire repolarization; thus the proposed adjustment may be somewhat crude, but evaluation of TWA's dependence on the T-wave amplitude is a first step in exploring whether TWA magnitude depends on the amplitude, or other attributes, of the entire J-T repolarization phase.

REFERENCES

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2. Madias JE. A proposal for a T-wave alternans index. *J Electrocardiol* 2007; May 30 [Epub ahead of print].

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