LETTER TO THE EDITOR

T-Wave Alternans by a 16-Lead Electrocardiogram System

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Dear Editor

The study by Burattini et al.,¹ published in the *Journal* on April 17, 2012, is important by its design to acquire data on T-wave alternans (TWA), employing a 16-lead exercise electrocardiogram (ECG) system on 58 patients with an implanted cardiac defibrillator. TWA amplitude was measured in the 12-standard, the 3-orthogonal, and the vector magnitude ECG leads, using their adaptive match filter (AMF), and implementing single-lead mean TWA amplitude and lead-system mean and maximum TWA values indexes for the standard leads and the orthogonal leads. The authors found an advantage for the lead-system TWA indexes in identifying patients with increased risk of cardiac instability, and that the standard and the orthogonal leads can be considered equivalent. I would appreciate the response of the authors to two questions: (1) Do they agree that direct recording of 15-lead ECGs would have been preferable, instead of the 8-lead ECG (I, II, V₁ to V₆) they used, with generation of leads aVR, aVL, aVF, X, Y, Z, via "well-known transformations," since the latter are based on certain assumptions for the transformation? (2) The authors found

an *interpatient* dependency on TWA magnitude on the T-wave amplitude (TA) in 15 of the 16 ECG leads (save for the Y lead), with r- values ranging between 0.21 and 0.51, and P values ranging between <0.05 and <10⁻⁵ (table 4 of their paper). However, taking into consideration the interpatient variation of the TA, the dependency on TWA magnitude on the TA, as I have previously indicated, is expected to be evaluated in *intrapatient* analyses.² The authors have an opportunity to end this impasse about the debate whether there is a dependency on TWA magnitude on the TA, by providing a "16-measurements TWA/TA correlations," corresponding to the 16-lead ECGs obtained in each patient, in a few, or if possible on all 58 patients, both "cases" and "controls" to resolve this issue once and for all. Would they oblige?

REFERENCES

1. Burattini L, Man S, Burattini R, et al. Comparison of standard versus orthogonal ECG leads for T-wave alternans identification. *Ann Noninvasive Electrocardiol* 2012;17:130-140.
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