

## Letter

### TO THE EDITOR

## Harmful Effects of Monophasic Cathodal Pacing



I read with interest the paper and editorial comment on cardiac resynchronization (1,2) in the June issue. In this meta-analysis, suppression of ventricular arrhythmias was found in the 70% of patients whose heart failure responded to therapy. A call was made for “improved pacing selection, new pacing technology (e.g., multipoint pacing), or new optimization algorithms (e.g., adaptive [cardiac resynchronization therapy])” to reduce nonresponse. However, let us be aware that nonresponse (and many other deficiencies of presently existing cardiac pacing) relates directly to the particular pulse used in pacemaking devices ever since their first introduction into clinical practice. Monophasic cathodal waveforms slow conduction and impair contractility (3,4), cause inflammation (4), increase the incidence of atrial fibrillation and heart failure morbidity (5,6), and increase mortality (6,7). In experimental animals (and humans acutely deliberately paced with cardiac resynchronization therapy systems in which the right ventricular tip electrode is made anodal), waveforms having anodal content (monophasic anodal and biphasic anodal/cathodal) reverse these effects (3), increase cardiac output (8,9), and chronically improve hemodynamic status after acute myocardial infarction (10). Recent work pacing cell cultures suggests specific cellular mechanisms for the respective deleterious and beneficial effects of these waveforms (11). To reduce nonresponse to cardiac resynchronization therapy and enhance benefits for both heart failure and further reduction of

arrhythmias, we must insist that the medical device industry provide clinical pacemakers incorporating biphasic (anodal/cathodal) pacing waveforms.

\*Morton M. Mower, MD

\*Department of Medicine  
University of Colorado-Denver  
2400 Cherry Creek S Drive, #403  
Denver, Colorado 80209  
E-mail: [mmower@aol.com](mailto:mmower@aol.com)

<http://dx.doi.org/10.1016/j.jacep.2016.07.006>

Please note: Dr. Mower has reported that he has no relationships relevant to the contents of this paper to disclose.

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