



## EDITORIAL COMMENT

## Ablation of multifocal premature ventricular contractions: A game of Whack-A-Mole?

### O desafio na ablação de arritmias ventriculares multifocais

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At the present time, radiofrequency ablation of premature ventricular contractions (PVCs) is indicated for symptomatic patients<sup>1</sup> or when a significant PVC burden could contribute to a decline in left ventricular ejection fraction (LVEF).<sup>2</sup> While a single PVC morphology is usually present, some patients may present with multifocal PVCs. These patients represent a clinical conundrum. While they may experience a significant benefit from effective suppression of their ventricular ectopy, the multifocal nature of their arrhythmia renders conventional mapping and ablation of all clinical foci challenging, and as such they are often not referred for ablation. When ablation is performed, the electrophysiologist will commonly target one PVC morphology only for a different focus to appear and for the first one to reappear soon after, leading to a similar feeling to playing Whack-A-Mole.

In this issue of the *Journal*, Martins et al.<sup>3</sup> report on their experience in the invasive treatment of patients with multifocal PVCs. The study population included patients both with idiopathic and with substrate-related ventricular ectopy, the majority with ischemic cardiomyopathy.

Although their acute procedural success rate was modest (64.7%), a five-fold reduction in PVC burden was observed across the cohort.

Surprisingly, an improvement in PVC burden was observed even in patients in whom some PVC morphologies were not targeted or whose ventricular ectopy was not completely suppressed. While this result may be the consequence of recruitment bias (i.e. patients may be referred for ablation after Holter monitoring with an abnormally high burden of PVCs and simply return to their usual PVC burden in a subsequent exam), it does nevertheless shed a positive light on the efficacy of this intervention even in the event of an unsuccessful procedure. Also reassuring is the absence of procedure-related complications.

The limitation in performing activation mapping was overcome by use of pace-mapping. In essence, a beat of the different PVC or ventricular tachycardia morphologies is recorded; subsequently, a roving catheter is placed in different sites of the ventricle and a stimulus delivered to induce a paced beat. This paced beat is then compared with the clinical morphology, either visually or with the help of an automated algorithm.<sup>4,5</sup> Sites in close proximity to the exit point of the arrhythmia will have a similar morphology, allowing delineation of the zone of interest even in the absence of ongoing arrhythmia.

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Overall, the patient cohort appeared to derive significant clinical benefit from ablation, with a statistically significant improvement in LVEF in the subgroup of 14 patients with suspected PVC-induced cardiomyopathy. However, four of the patients showed no improvement in LVEF despite effective PVC suppression. These could simply represent cases in which the ventricular ectopy was a marker for an underlying cardiomyopathy. However, these results align with a recently described animal model of PVC-induced cardiomyopathy in which, even after complete resolution of induced PVCs, the authors observed persistent dyssynchrony and fibrosis at histological analysis.<sup>6</sup> While provocative, this finding may suggest a time-sensitive window of treatment in this clinical entity.

The authors are to be commended on their report on this subject. Physician perception of therapeutic futility in patients with multifocal PVCs often leads to treatment being withheld, and more effective therapies are sorely needed. This is especially important in the context of patients receiving cardiac resynchronization therapy, in whom PVCs are often polymorphic, related to complex scar substrate, and available antiarrhythmic options may need to be discontinued due to adverse effects. As novel mapping technologies are refined and tools such as simultaneous mapping and electrocardiographic imaging become widespread, we may be better equipped to whack all the moles.

### Conflicts of interest

The authors have no conflicts of interest to declare.

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