

## A welcome to relapse-predictor electrical signs in patients with cardiofibrillators

### *Una bienvenida a los signos eléctricos predictores de recidivas en pacientes con cardiodesfibriladores*

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#### To the Editor:

I carefully read the article by Alemán-Fernández *et al.*<sup>1</sup>, in which the pursuit of electrical signals predictors of relapse of malignant ventricular arrhythmias (MVA) in patients with implantable cardioverter defibrillator was proposed. First of all, I would like to congratulate this group of researchers that with these results provide us with a real approach to electrical predictors of relapse in this group of patients, knowledge sometimes controversial and still very limited in the international literature.

Regarding the selection of study groups, divided into A and B, according to the presence or absence of MVA relapse, respectively; I would like to point out the heterogeneity of the two groups. For example the presence of 10 patients with dilated cardiomyopathy (DCM) in group A and 1 patient with the same condition in group B. The number of patients with primary electrical disease was similar and for ischemic heart disease group A exceeded group B in 3 patients. This heterogeneity in the underlying disease can create differences regarding the values measured in the electrocardiogram, just like comorbidity and toxic behaviors of each patient, which vary the electric measurements in each of them<sup>2,3</sup>. However, the most common comorbidity is not described by groups or subgroups of patients.

For example, QRS measurement showed no signi-

ficant differences between groups but it did for the subgroup of electrical storm with mean values above 120 milliseconds (ms), located in group A. In the article, it is not detailed whether these values belong to patients with DCM, primary electrical disease, ischemic heart disease or another, and the longer duration of QRS in patients with DCM is well recognized, in which cardiac resynchronization therapy can be used, and this latter subgroup of patients is on top in the group of relapse. A QRS > 110 ms represents a risk 2.5 times higher of sudden death<sup>4</sup>.

The authors<sup>1</sup> rightly indicate that there may be variability in the parameters reflecting the dispersion of repolarization in the same patient at different times, and argue that if they had measured several baseline electrocardiograms of each, maybe higher figures regarding QT dispersions would have been found. The latter, and the heterogeneity of the subgroups could be limitations of the research and studying measurements in the subgroups independently might have provided invaluable results.

Again I express my agreement with the welcome to these results, because as the authors rightly note, it allowed them to follow proper behavior: a more aggressive treatment of the underlying disease, choice of antiarrhythmic drug, device reprogramming and a closer follow-up. In my opinion, I would propose the authors a new publication dividing the measurements

by subgroups and giving us the therapeutic behaviors followed after obtaining the results, to enrich our knowledge and help us in clinical practice.

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## Reply to “A welcome to relapse-predictor electrical signs in patients with cardiodefibrillators”

### *Respuesta a “Una bienvenida a los signos eléctricos predictores de recidivas en pacientes con cardiodesfibriladores”*

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#### To the Editor:

First, we would like to thank the welcome of the author of the letter and then to state some considerations.

The search of premonitory electrical signs to detect risk of malignant ventricular arrhythmias (debut or relapse) in patients with and without automatic implantable cardioverter defibrillator has been on for years. These are much discussed issues on which there is a profusion of publications and controversies in the world. Because of its complexity it is one of the greatest challenges that Cardiology faces and an unsolved problem<sup>1,2</sup>. Why? Among other things, because of the complexity of arrhythmias that have such diverse processes such as dynamic factors (action potential duration and conduction velocity duration,

electrical memory, electrotonic currents), all of which ranges between stability and instability. Moreover, the degree of heterogeneity of tissues: isotropy, anisotropy, homogeneity, action potential gradients, structural remodeling (fibrosis, infarction), electrical (hypertrophy, myocarditis) and neurological, as well as genetic defects (channelopathies, cardiomyopathies). The greater or lesser risk will depend on the interaction between dynamic factors and heterogeneity of tissues and the spectrum will range from lower vulnerability to higher risk<sup>3</sup>. Also, as it is known, arrhythmias will occur when everything is favorable in the anatomical and functional substrate, the triggers and essential arrhythmogenic mechanisms, all arranged in order by the autonomic nervous system.

No criteria is absolute, with and without structural

disease, the numerous signs described are generally of low predictive value, low sensitivity and specificity, but together they can achieve an approach to reality and be useful to define high-risk groups but not so useful to identify individuals at risk.

In our work<sup>4</sup>, the number of patients did not allow to divide the group into different subpopulations, but rather to try a general overview of the problem; moreover, many of these signs are shared as indicative of risk in the different subgroups.

It is known that measurements of repolarization vary by: frequency, heart rate, prematurity, conduction velocity, refractoriness, the state of the autonomic nervous system and all of it is absolutely changing; so, the assessment of electrocardiographic markers turns very complex. If there is structural disease, it can develop and change the circumstances; if it does not exist, the arrhythmogenic substrate itself can be modified. The variability of repolarization and all electrical findings is huge but all series reviewed present this situation. However, it is important to approach the problem because these arrhythmias are common after implantation of the devices and are a great conflict by the wear of the equipment, discomfort for the patient and the typical proarrhythmic effects of their shocks.

Regarding heterogeneity, it is universal. It not only exist between groups A and B considered by us, but in all: the underlying disease, the electrical, electrolyte and metabolic status, measurements, time to take the recordings, their number, observers.

The objective of this work was not to consider comorbidity or toxic effects, but only to measure certain electrical signals.

The duration of the QRS complex is not only important as an electrical predictor in dilated cardiomyopathy, but as a risk factor for arrhythmogenic sudden death in general.

In the future, our group or others, you, for example, may make this division into subpopulations and consider other (not exclusively) electric factors.

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