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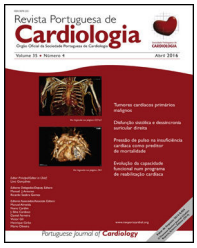

EDITORIAL COMMENT

The variability of the electrocardiogram in Brugada syndrome: Implications for subcutaneous implantable cardioverter-defibrillator candidacy

A variabilidade do ECG na síndrome de Brugada: implicações na seleção de candidatos a CDI subcutâneo

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In this issue of the *Journal*, von Hafe et al.[1] present data on a series of patients with well documented Brugada syndrome (BrS) who were screened as possible candidates for implantation of a subcutaneous implantable cardioverter-defibrillator (S-ICD). As detailed in the study, and as required by the manufacturer of the device, patients considered for an S-ICD have to fulfill certain electrocardiographic (ECG) criteria based on a specific analysis tool. Basically, a good sensing signal with good discrimination between depolarization (QRS complex) and repolarization (ST segment-T wave) is required in order to identify potential arrhythmias, but also to avoid oversensing, particularly T-wave oversensing, that may result in a false positive arrhythmia diagnosis and in inappropriate shocks.

The problem of T-wave oversensing in BrS is a well-known phenomenon that goes back to the very beginning of the description of this disease. Historical patients were documented in the past to have required implantation of left ventricular epicardial leads because of T-wave oversensing at many right ventricular endocavitary locations (unpublished data). These patients prompted the development of new algorithms for endo- and epicardial systems to avoid T-wave oversensing. Use of dynamic sensing thresholds and T-wave suppression algorithms have resulted in the virtual disappearance of this problem for endocavitary systems.

As also pointed out by von Hafe et al., a significant proportion of patients with BrS immediately fail to qualify for safe implantation of a S-ICD. This percentage has been as high as 30% in some studies[2] and was 14% in von Hafe et al.'s series. When their patients underwent exercise testing and ECG qualification for an S-ICD was repeated after exercise, the proportion of patients not qualifying for an S-ICD increased to one in three. These observations are extremely important because an S-ICD can theoretically reduce the number of complications associated with endocavitary leads. However, these advantages come with some drawbacks, like the lack of antitachycardia pacing that may be useful to avoid a shock in the 4% of patients with BrS suffering from pace-terminable monomorphic ventricular tachycardia.[3] A second drawback of S-ICDs is the lack of antibradycardia pacing. Conduction disturbances and sick sinus syndrome are common in BrS and also have a very negative prognostic impact.[4] Correction of these bradyarrhythmia episodes may be one of the reasons that patients with BrS do not present more syncopal episodes after transvenous ICD implantation. An important subset of patients with BrS suffer from atrial fibrillation that may be completely asymptomatic. Atrial fibrillation is an important prognostic issue in BrS because of its complications, including embolization,[5] and as a potential cause of inap-

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propriate shocks (14% of patients in the series by Sarkozy et al.[6]). Correct identification of atrial fibrillation requires atrial sensing, something not available with an S-ICD. Thus, while we are all very much in favor of the theoretical advantages of an S-ICD in BrS compared to endocavitary systems, the available data do not seem to support the S-ICD as the best option.

As complications of endocavitary leads have invariably been related to the number of leads implanted, reducing the number of leads while maintaining the advantages of atrial sensing and ventricular antitachycardia and antibradycardia pacing seems to be the best option at present. Single-pass endocavitary leads with A and V sensing and V pacing have been available for some time.[7] In combination with T-wave suppression algorithms and remote monitoring, they have been shown to offer the best solution not only in BrS but in a wide variety of diseases, offering the best therapies while avoiding unnecessary complications.

The study by von Hafe et al. is an important one because it tackles the problem of ECG variability in BrS. If for any reason an S-ICD is considered in a patient with BrS there is no doubt that ECG candidacy testing at rest and after exercise has to become part of the routine assessment before S-ICD implantation.

Conflicts of interest

Pedro Brugada is a consultant for Biotronik.

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