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Strategic Implantable Cardioverter Defibrillator Programming for Shock Reduction: Is it Time for "Out of the Box Settings"

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Editorial

The effectiveness of implantable cardioverter-defibrillator (ICD) in reducing mortality in patients with heart failure and reduced left ventricular ejection is well documented, so it's now the standard of care in primary and secondary prevention of sudden cardiac death (SCD) [1,2]. Since indications for ICD therapy have expanded, concern about possible adverse effects of ICD therapies is increasing. Shock therapies are closely associated with progressive pump failure and adversely affect patients' survival irrespective of appropriateness [3-5]. And also cause anxiety disorder almost one in four patients and also bring about issues which impair QoL such as avoidance behaviors, sedentary lifestyle, sexual problems [6,7]. Therefore, minimizing or avoidance of unnecessary and inappropriate ICD shocks remains an important and challenging goal.

Dominance of primary prevention indications leads to see that avoidable shocks assumed a relatively larger proportion of total therapy. In order to decrease these avoidable ICD shocks, several studies have focused on specifying the best device programming strategies. Avoidable ICD shocks are indicated to have been reduced by evidences based on the programming of the detection duration, detection rate, ATP algorithms discriminating SVT from VT, and specific programming to minimize the sensing of noise [8-17].

Several large studies, including 4 randomized trials (MADIT-RIT, EMPIRIC, ADVANCE III and PROVIDE) and 2 prospective studies (PREPARE and RELEVANT) have examined the effect of ICD programming which is designed to decrease inappropriate shocks by increasing both detection duration and detection heart rates [8-13]. When compared with conventional programming, ICD therapy reduction strategy caused a significant 30% decrease in all-cause mortality in a meta-analysis of the above studies including a total of 7687 patients. The data from RELEVANT, MADIT-RIT, ADVANCE III and PROVIDE trials that analyzed the appropriateness of shocks, showed 50% reduction in inappropriate shock without an increased risk of syncope and appropriate shock [18].

High-rate cutoff programming is another promising strategy associated with reduced mortality in 1 study [8]. "Very high rate" programming, with a therapy onset rate of 4220 beats/min, has also shown to be related to low therapy rate [19]. It is demonstrated by a recent trial that combined long detection interval with high-rate cut-off was also effective in decreasing appropriate shock and inappropriate therapy without increasing the incidence of syncope and slow VT in secondary prevention patients [20].

Used in new CRT-D, a new generation of detection and discrimination algorithms significantly decreased inappropriate shocks when compared with standard CRT-D. This result has important implications for patients' QoL and prognosis without compromise on VF sensitivity or risk of syncope. Combining a new generation of arrhythmia discrimination algorithms and evidence-based shock reduction programming leads to a significant decrease in inappropriate shocks, ATP, and detections [21].

New strategic shock reduction programming's are recommended in the current guidelines because of large randomized or observational studies, where patients showing variability in terms of comorbidity were admitted, and single, dual or triple chambered devices produced by many manufacturers were used, provided satisfying results in terms of efficacy and safety. However, there is not enough data showing how many new programming strategies are used worldwide. Especially, physicians who have reservations about arrhythmic syncope risk, should consider reprogramming options with new strategies for patients with greater risk developing depression after shock therapy such as individuals with Type D personality, or patients with shocking, in addition to medical or invasive therapeutic options. They should not allow ICD which is a life-saving treatment to effect on life negatively.

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