ABSTRACT

In this paper, we aimed to present an unusual example of ICD shock following successful termination of arrhythmia by antitachycardia pacing.

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Antitachycardia pacing, implantable cardioverter defibrillator, shock

ÖZET

Bu yazıda antıtaşıkardık pacing ile başarılı bir şekilde sonlandırılan aritminin sonrasında gözlenen nadir şokunu sunmayı amaçladık.

Keywords
Antitαşıkardık pacing, implant edilebilir kardiyoverter defibrilatör şok

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Case report

A 31-year-old man with arrhythmogenic right ventricular cardiomyopathy and episodes of ventricular tachycardia had an implant of a dual chamber implantable cardioverter-defibrillator (ICD) (Maximo II DR D284DRG, Medtronic Inc., Minneapolis, MN, USA) for prevention of sudden cardiac death. The ICD was programmed with a ventricular tachycardia (VT) zone at 350ms (171 bpm) and a ventricular fibrillation (VF) zone at 300ms (200 bpm). The fast ventricular tachycardia (FVT) zone was off but antitachycardia pacing (ATP) during charging was programmed on.

One week later he admitted to our department with a complaint of an ICD shock while seated watching television. Interrogation of the ICD device was performed. The patient was found to receive a burst as well as a 34.6 joule shock for an episode of tachyarrhythmias (Figure 1). Electrogram revealed a tachycardia with atrioventricular (AV) dissociation at median rate of 206 bpm treated with ATP during charging. Interestingly, despite termination of the tachycardia with ATP, the device went on to deliver an inappropriate shock for sinus tachycardia (Figure 2).

Discussion

Intracardiac electrogram shown in Figure 2 revealed that the patient received an ICD shock for a rhythm and a rate that was lower than the programmed VT or VF zones. ATP during charging is a feature of Medtronic devices that is designed to reduce the number of shocks delivered by an ICD for the treatment of tachyarrhythmias (1). When programmed, ATP during charging leads to the delivery of a burst of ventricular pacing while the capacitors are charging for a high-energy therapy. After the ATP is delivered and before the high-energy shock is given, the ICD reconfirms the presence of the tachycardia and proceeds to synchronization (2-4).

The process of reconfirmation prior to delivery of a high-energy therapy is done using a sequence of detection intervals lasting 60ms more than the lower limit of the slowest detection interval programmed with VT (or VF) therapies. If ATP during charging is disabled, the reconfirmation begins as the charging is initiated. When ATP during charging is enabled, the reconfirmation process begins at the end of charging (3-4). In both instances, delivery of high-energy therapy will be inhibited by the occurrence of 80% ventricular events that fall out of the VT or VF (if VT therapy is disabled) interval plus 60ms (2,3).

As could be observed in Figure 2, patient received a burst of 8 beats for a tachycardia falling in the VF zone. The tachycardia that was detected was a ventricular tachycardia with a cycle length of 290ms. The arrhythmia was treated as VF because its rate fell within the VF zone. The burst successfully terminated the episode of VT and the patient went back into sinus tachycardia with frequent ventricular extrasystoles at an average cycle length of 390ms. That rate was slightly slower than the set VT zone (350ms) but did fall into the reconfirmation interval of 410ms (350 + 60ms) and led to the delivery of a 34.6-joule shock (1-3).

This case illustrates an unusual example of ICD shock following successful termination of arrhythmia by ATP. A solution for this problem would be to program the patient to receive ATP before charging. With ATP before charging, full redetection of the arrhythmia has to occur before initiation of the next ATP sequence or shock. Alternatively, keeping an FVT zone program-
med on (rather than turning it off when ATP during charging is enabled) would have similarly avoided the problem (1-3).
Implantable Cardioverter Defibrillator Shock Despite Termination of Ventricular Tachycardia by Antitachycardia Pacing During Charging

Figure 2

Intracardiac electrograms.
REFERENCES

1. Medtronic EnTrust, Virtuoso, Maximo II and Secura ICDs and Concerto CRT-D, Maximo II and Consulta System Reference Guides.

