

Management Of T-Wave Oversensing After Extracardiac ICD Implantation In A Pediatric Patient With Brugada Syndrome

*Kriebel T. (1), Buob A. (2), Raus E. (1), Schneider H. (1), Krause U. (1), Sigler M. (1), Paul T. (1)
Department for Pediatric Cardiology and Intensive Care Medicine, Georg-August-University,
Göttingen, Germany (1); Department for Cardiology, University hospital, Homburg, Germany (2)*

Introduction: The extracardiac system offers a safe and effective approach for ICD implantation in infants and small children. The implantation technique includes placement of the defibrillation lead subpleurally along the course of the 6th rib, attachment of bipolar steroid-eluting sensing and pacing leads to the anterior wall of the right ventricle, and implantation of the device subdiaphragmally as “active can”. This ICD configuration allows together with modern algorithms to overcome T-wave oversensing due to alternative sensing options.

Case report: An extracardiac ICD (Medtronic Protecta VR) was implanted in 18-months-old patient (body weight 9.8 kg) due to familial Brugada syndrome. Intraoperative DFT was ≤ 10 J, intraoperative RV amplitude was 7.5-5.5 mV, and amplitudes during VF varied from 3.0 to 7.0 mV during DFT testing. RV sensing was programmed to 0.45 mV with the auto adjustment sensitivity algorithm. 6 months later, on routine follow-up ICD interrogation recurrent episodes of T-wave oversensing were observed. Up to 10 inappropriate shocks had been avoided by the novel T-wave oversensing (TWOS) algorithm (SmartShock Technology™, Medtronic Inc.). By discrimination of R- and T-waves through differential filters together with R- to T-wave beat to beat pattern analysis therapies were withheld. In addition, R-wave amplitude was reduced to a mean of 3.5 mV with a variance from 1 to 5 mV. After reprogramming RV sensing to 0.6 ms T wave oversensing was still present due to comparable R and T-wave amplitudes. With programming sensing to 1 mV, intermittent undersensing of R-wave was noted. Therefore, ventricular sensing was programmed between the RV leads and the subpleural shock electrode with an estimated sensing distance of 8 cm. With this configuration sensing was 9.8 mV and no further T wave oversensing was observed with a RV sensing at 0.6 mV. Induced VF was appropriately detected and the DFT was stable at ≤ 10 Joule. After a follow-up of 2 months, no further T wave oversensing was noted.

Conclusion: Alternative sensing options of the extracardiac ICD together with modern algorithms may prevent T wave oversensing and avoid traumatic inappropriate shocks and reoperations.