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Case Report: Overdrive Pacing in Refractory Ventricular Tachycardia

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Abstract:

We report a case of a 67-year-old male who presented to the emergency department (ED) for palpitations and complaint of his automated implantable cardioverter defibrillator (AICD) firing at home who had multiple episodes of persistent ventricular tachycardia (VT) during his course of stay in the ED. Patients with pacemakers and AICDs can present an additional layer of complexity when treating these conditions. Temporary overdrive pacing (TOP) should be considered as a treatment to correct refractory ventricular tachycardia in patients with implanted pacemakers and AICDs presenting to the ED.

Case Presentation:

A 67-year-old presented to the ED with his AICD firing at home. He was brought in by EMS who reported he had multiple episodes of unstable VT and was cardioverted 7 times prior to arrival. The patient denied chest pain, shortness of breath, abdominal pain, nausea, vomiting, or back pain. He had a history of atrial fibrillation on Eliquis and cardiomyopathy. Vital signs were as follows: heart rate 87 beats per minute, respiratory rate 18 breaths per minute, blood pressure 143/76 mmHg and a temperature 97.9 degrees Fahrenheit. The physical exam showed a systolic cardiac murmur and clear lung sounds bilaterally without any increased respiratory effort; there was no diaphoresis, he was well appearing and resting comfortably. Abdomen was soft, non-tender without rigidity, rebound or guarding. He was alert and oriented x4 and answered questions appropriately. He denied any pain complaints. In the ED, the patient had persistent episodes of wide-complex VT (Fig 1) and had to undergo a total of 10 rounds of synchronized cardioversion with return to sinus tachycardia at a rate of approximately 110-120 bpm. (Fig 2). He was also given two 150mg bolus doses of amiodarone followed by a drip, a lidocaine drip,

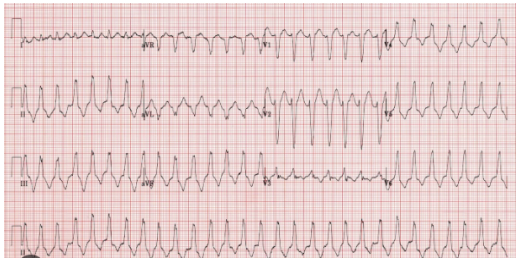

Figure 1: Wide-complex ventricular tachycardia

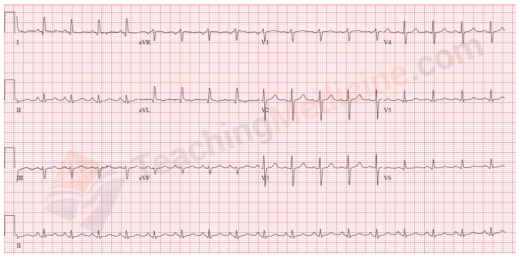

Figure 2: Sinus tachycardia

calcium gluconate and bicarbonate in an attempt to definitively terminate the rhythm. However, this multimodal treatment approach was not sufficient in preventing return of VT. The patient was ultimately admitted to the ICU where he had persistent episodes of VT requiring multiple additional electrical shocks and antiarrhythmic medications. The patient eventually received TOP with resolution of VT. The patient was transferred to a nearby hospital with cardiac catheterization capabilities. He underwent cardiac catheterization with ablation, and was discharged in stable condition.

Discussion:

Refractory ventricular tachycardia is a type of electrical storm (ES). ES is a life-threatening cardiac emergency in which there is electrical instability characterized by frequent ventricular arrhythmias in a short amount of time. It is defined as 3 or more episodes of sustained ventricular tachycardia or ventricular fibrillation in 24 hours. “Studies have shown that in only 10-25% of patients with the electrical storm, clear precipitating causes were identified. Some important causes are reversible, and their management can facilitate the control of the arrhythmias like acute myocardial ischemia, new or worsening heart failure, drug intoxication, or electrolyte disturbances” [3]. None of these issues were present in our patient. ES necessitates early management. Amiodarone is the drug of choice. Lidocaine and beta blockers can also be used as adjunct treatments. TOP can be considered to temporize the electrical storm when catheter ablation is not immediately available, as was the case in our patient. In our case, we report a state of severe ES of unknown origin. The arrhythmia persisted despite the frequent cardioversion in addition to multiple antiarrhythmics. In cases like our patient’s, early intervention by way of TOP can be life-saving and prevent short and long-term sequelae on the myocardial muscles, and improve patient outcomes.

Conclusions:

Refractory ventricular tachycardia or electrical storm is a dangerous condition that needs immediate and definitive management to prevent decompensation of a patient’s condition and possible sequelae. Patients with pacemakers and AICDs may also require TOP, especially when the rhythm is refractory to standard treatment. Temporary overdrive pacing should be considered in an emergency department setting in some patients and situations as part of treatment for refractory VT.

References:

Available upon request.