Termination of Ventricular Tachycardia by Anti Tachycardia Pacing—An Uncommon Diagnosis on 12 Lead Surface ECG

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A 56 years old male had undergone implantation of Dual chamber Automated Implantable Cardioverter Defibrillator (AICD) in November 2011 for documented sustained monomorphic ventricular tachycardia. He was a known case of Ischaemic heart disease (IHD) and had undergone angioplasty with a medicated stent to the mid left anterior descending coronary artery in September 2011. 2 D Echocardiography revealed left ventricular (LV) systolic dysfunction with LV ejection fraction of 35%. There was mild concentric left ventricular hypertrophy with normal chamber dimensions and normal right ventricular function. He had hypertension since four years, which was under control on therapy and was recently detected to have Diabetes mellitus which was controlled with Metformin and diet. He had followed up for symptoms of per rectal bleeding in January 2012 and colonoscopy revealed carcinoma at the junction of rectum and anal canal. This was proven on biopsy. After consultation with an oncosurgeon, it was diagnosed to be in an operable stage and posted for surgery (abdomino–perineal repair) after high risk informed consent in view of recent angioplasty with a medicated stent and ventricular dysfunction.

The intraoperative course was uneventful. On postoperative day 2 the patient received two shocks from the AICD device within three hours interval. On investigation there was hypokalemia (K+ 2.8 meq/L) and anemia (Hb 8.0 gm%). These were corrected with potassium supplementation and blood transfusion respectively. Intravenous magnesium was also administered. Serial ECG monitoring during this period picked up several runs of non sustained monomorphic ventricular tachycardia (NSVT). As the patient was already on maintenance amiodarone, further intravenous amiodarone was not administered. The runs of non sustained tachycardia subsided completely after correction of hypokalemia. Interestingly one of the serial ECGs picked up the termination of an episode of NSVT by pacing (Anti Tachycardia Pacing –ATP). This case is being reported, as ATP is easily picked up on intracardiac electrograms (EGM) when the AICD device is interrogated by a dedicated programmer, but it is very uncommon to be documented when a surface ECG is being recorded (Figure 1).

The use of ICD and CRT-D (Cardiac Resynchronization Therapy-Defibrillator) devices, have been extremely successful in decreasing mortality rates for patients with ventricular dysfunction and mild to moderate heart failure. However, high-voltage shock therapy is painful and not always necessary. Quality-of-life scores in the ICD population are poor and are significantly affected by the occurrence of shocks. Shock pain, anticipation of the next shock, antiarrhythmic drugs, and hospitalizations due to shocks are all contributors. A recent trial demonstrated that the principle cause (26%) of all hospitalizations for ICD patients in a 12-month span was due to appropriately detected VT/VF and consequent shocks from their ICD.1

The PROVE trial showed that the use of antitachycardia pacing (ATP) programming in patients implanted with ICD or CRT-D devices was successful in terminating 89% of ventricular tachycardia (VT) episodes, potentially avoiding painful or unnecessary shocks in those patients.2 The clinical implications are that ICD patients may be spared the majority of painful shocks if ATP is programmed as the first therapy for VT. Also the longevity of ICDs may be improved by fewer capacitor charges.3

References

Fig. 1: Ventricular tachycardia terminated by Anti tachycardia pacing

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