

Elimination of refractory ventricular tachycardia storm and fibrillation using stereotactic radiotherapy

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Abstract

Ventricular tachycardia storms and fibrillation are potentially lethal arrhythmias with limited treatment options. Failed catheter ablation is associated with a fourfold mortality increase in this population. Stereotactic body radiotherapy has been proposed as last resort in these patients. We report a patient in whom radiotherapy was safely performed leading to the elimination of ventricular arrhythmia during a one- year- follow- up period.

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Introduction

Ventricular tachycardia (VT) storms and ventricular fibrillation (VF) are arrhythmias with limited and unsatisfactory treatment options and are associated with high mortality. Failed catheter ablation poses a fourfold increased risk of death in patients with VT/VF. Furthermore, heart failure and adequate implantable cardioverter defibrillator (ICD) shocks are associated with impaired prognosis^[1]. Stereotactic body radiotherapy (SBRT) has been proposed as a last resort in patients with VT storm and VF refractory to medical therapy and catheter ablation^[2].

Case report

A 56-year-old male patient with history of myocardial infarction and heart failure presented to our hospital with cardiac arrest due to VT storm that degenerated to ventricular fibrillation. The VT storm was refractory to pharmacotherapy. The patient experienced a previous episode of VF ten years ago, following which he underwent multiple revascularizations of the left anterior descending (LAD) coronary artery. He had ever since a left ventricular aneurysm with decreased left ventricular ejection fraction (LVEF) (15%). He underwent ICD implantation seven years ago. ICD Interrogation revealed multiple VT and VF episodes within the last 6 Weeks, which were treated with ATP or adequate ICD shocks. After resuscitation and stabilization, the patient underwent catheter ablation of VT. Electroanatomical mapping revealed an anterior and antero-septal scar area in the left ventricle. Catheter ablation was performed. Nonetheless, the VT recurred after three months. Due to therapy-refractoriness, extensive substrate, and involvement of the septum, SBRT was performed. Cardiac radiotherapy was delivered in a single dose of (25 Gy) high precision-SBRT based on the electroanatomic mapping.

SBRT was performed without complications or ICD dysfunction. During a one-year follow up via ICD tele-monitoring as well as outpatient clinic assessments, no recurrence of any VT was documented, after a massive peri-interventional VT burden. The LVEF improved to 31%. No complications related to SBRT were detected. The patient remained on Amiodarone, β -blockers, platelet inhibitor, diuretics and a Sacubitril/valsartan combination.

Conclusion

Radiotherapy offers a feasible, safe and effective therapy to VT storms and VF refractory to pharmacotherapy and ablation. We report a patient in whom radiotherapy was safely performed leading to complete elimination of ventricular arrhythmia during mid-term follow up. Our results should be confirmed in a prospective multi-center trial.

References

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