Clinical outcomes of stereotactic radio-ablation for the management of refractory ventricular tachycardia

Authors:
R Jumeau¹, M Ozsahin¹, J Bourhis¹, V Vallet², M Zeverino², R Moeckli², F Duclos¹, J Schwitter³, M Le Bloa⁴, L Bisch⁴, P Pascale⁴, E Pruvot⁴, ¹University Hospital Centre Vaudois (CHUV), Radiation Oncology - Lausanne - Switzerland, ²University Hospital Centre Vaudois (CHUV), Radiation Physics - Lausanne - Switzerland, ³University Hospital Centre Vaudois (CHUV), Cardiac MR center - Lausanne - Switzerland, ⁴University Hospital Centre Vaudois (CHUV), Cardiology - Lausanne - Switzerland,

Topic(s):
Ablation of Ventricular Arrhythmias

Citation:
Introduction:
Ventricular tachycardia (VT) caused by myocardial scarring bears a significant risk of mortality and morbidity that can be partially controlled by the implantation of a cardioverter-defibrillator (ICD). Recently, stereotactic arrhythmia radio-ablation (STAR) appeared as a promising tool for the management of VT refractory to antiarrhythmic drugs (AADs) and catheter ablation (CA). We present herein the outcomes of our series of patients treated under an institutional STAR program for refractory VT.

Material and Methods:
Enrolled patients suffered from recurrent VT or electrical storm (ES) refractory to CA and AADs. Before the procedure, an electroanatomic mapping (EAM) was performed to localize the VT substrate (VT-sub). All patients underwent a planning CT co-registered with a cardiac MRI or a cardiac CT to help in volume definition. For each case, the cardiologist delineated the VT-sub according to the EAM data. A median dose of 25 Gy (range, 20–25 Gy) was delivered to the VT-sub.

Results:
Since September 2017, five patients with VT or ES refractory to AADs and CA were treated. Four patients were elective, while another one, hospitalized in the intensive care unit (ICU), was intubated because of an ES with multiple ICD shocks refractory to CA. VT was due to an ischemic cardiomyopathy in two patients, to an inflammatory cardiomyopathy in two patients and to an idiopathic cardiomyopathy in the ICU patient. In all patients, STAR was successfully delivered using near real-time ICD lead tracking with an average time of 54 minutes. The median ablation volume was 22 cc (range, 19-35 cc). After a median follow-up of 5 months (range, 4-11), the elective patients did not experience any sustained VT recurrence or electrical shock (Panel A). The ICU patient was extubated 3 days after STAR and remained free of ICD shocks during 4 months; he presented, however, a new ES episode 19 weeks (Panel B) after the procedure related to a remote VT-sub successfully treated by CA. Importantly, after ICD interrogation, no sustained VT episodes arising from the irradiated site were detected in all patients.

Conclusion:
STAR appears to be an efficient and promising tool for the treatment of refractory VT caused by myocardial scarring. Recurrence was observed only in non-ischemic cardiomyopathy at a site remote from the irradiated volume.
Abstract: P1129
Clinical outcomes of stereotactic radioablation for the management of refractory ventricular tachycardia

Authors: R Jumeau 1, M Ozsahin 1, J Bourhis 1, V Vallet 2, M Zeverino 2, R Moeckli 2, F Duclos 1, J Schwitter 3, M Le Bloa 4, L Bisch 4, P Pascale 4, E Pruvo 4

1 University Hospital Centre Vaudois (CHUV), Radiation Oncology - Lausanne - Switzerland, 2 University Hospital Centre Vaudois (CHUV), Radiation Physics - Lausanne - Switzerland, 3 University Hospital Centre Vaudois (CHUV), Cardiac MR center - Lausanne - Switzerland, 4 University Hospital Centre Vaudois (CHUV), Cardiology - Lausanne - Switzerland

Topic(s): Ablation of Ventricular Arrhythmias

Introduction: Ventricular tachycardia (VT) caused by myocardial scarring bears a significant risk of mortality and morbidity that can be partially controlled by the implantation of a cardioverter-defibrillator (ICD). Recently, stereotactic arrhythmia radioablation (STAR) appeared as a promising tool for the management of VT refractory to antiarrhythmic drugs (AADs) and catheter ablation (CA). We present herein the outcomes of our series of patients treated under an institutional STAR program for refractory VT.

Material and Methods: Enrolled patients suffered from recurrent VT or electrical storm (ES) refractory to CA and AADs. Before the procedure, an electroanatomic mapping (EAM) was performed to localize the VT substrate (VT-sub). All patients underwent a planning CT co-registered with a cardiac MRI or a cardiac CT to help in volume definition. For each case, the cardiologist delineated the VT-sub according to the EAM data. A median dose of 25 Gy (range, 20–25 Gy) was delivered to the VT-sub.

Results: Since September 2017, five patients with VT or ES refractory to AADs and CA were treated. Four patients were elective, while another one, hospitalized in the intensive care unit (ICU), was intubated because of an ES with multiple ICD shocks refractory to CA. VT was due to an ischemic cardiomyopathy in two patients, to an inflammatory cardiomyopathy in two patients and to an idiopathic cardiomyopathy in the ICU patient. In all patients, STAR was successfully delivered using near real-time ICD lead tracking with an average time of 54 minutes. The median ablation volume was 22 cc (range, 19–35 cc). After a median follow-up of 5 months (range, 4–11), the elective patients did not experience any sustained VT recurrence or electrical shock (Panel A). The ICU patient was extubated 3 days after STAR and remained free of ICD shocks during 4 months; he presented, however, a new ES episode 19 weeks (Panel B) after the procedure related to a remote VT-sub successfully treated by CA. Importantly, after ICD interrogation, no sustained VT episodes arising from the irradiated site were detected in all patients.

Conclusion: STAR appears to be an efficient and promising tool for the treatment of refractory VT caused by myocardial scarring. Recurrence was observed only in non-ischemic cardiomyopathy at a site remote from the irradiated volume.