Background: Optimal stereotactic body radiation therapy (SBRT) planning methods for VT ablation are yet to be defined.

Objective: To evaluate a multimodal approach for SBRT planning.

Methods: Across 7 international centers, patients with drug- and catheter ablation-refractory VT underwent cardiac CT and MRI imaging prior to SBRT. The inHEART technology was used to create image-based 3D models of substrate, cardiac anatomy, and organs at risk (coronaries, phrenic nerve, gastrointestinal tract, AV node, ICD leads). In MUSIC software (IHU Liryc-Inria), 3D models were fused with prior EP maps, and SBRT targets were interactively drawn in 3D by the referring EP cardiologist. Transmural target volumes and organs at risk were fused with a 4D planning CT and used to plan SBRT in Eclipse software (Varian). Therapy was delivered using either Truebeam or Edge systems (Varian).

Results: 30 patients were included (age 70 ± 10 years, 90% men, LVEF 26 ± 9%, 67% ICM, 47% NICM or mixed, 1.7 ± 1.2 prior catheter ablations). SBRT was delivered on median planning treatment volumes of 96 [Q1-Q3: 63-149] mL, at a total dose of 25 Gy over 1 single session. Over a median follow-up of 4 [Q1-Q3: 2-8] months, death occurred in 11 (37%) patients, due to arrhythmia recurrence in 4 (13%). Follow-up at 6 months was available in 14 patients. In these, the median numbers of VT episodes and ICD shocks over the 6 months preceding SBRT were 20 [Q1-Q3: 9-27] and 8 [Q1-Q3: 5-15], respectively. In the 6 months following SBRT, these decreased to 0 [Q1-Q3: 0-30] and 0 [Q1-Q3: 0-0], respectively (P<0.001 for both). 8/14 (57%) patients were free from any VT recurrence, and 11/14 (79%) were free from any ICD shock. In the total cohort, complications attributed to SBRT were observed in 2/30 (7%), none of which were fatal (heart failure and pneumonitis, both managed with steroids).

Conclusion: In patients with severe drug- and catheter ablation-refractory VT, SBRT planning based on 3D image-based models fused with prior EP maps is feasible, and associated with favorable efficacy and safety profiles.

CA-533-02

STANDARD CARDIAC RADIOABLATION DOSE (25 GRAY) DOES NOT CAUSE MYOCYTE INJURY OR NEW FIBROSIS

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Background: Noninvasive cardiac radioablation (CRA) is an emerging therapy for refractory ventricular tachycardia (VT). Focused radiation to the heart is expected to cause local myocardial destruction with replacement fibrosis (ablation effect). The extent this effect in humans is unknown.

Objective: To measure the CRA ablation effect with serial serum biomarkers and late gadolinium enhanced cardiac MRI (LGE-CMR).

Methods: Single-center, IRB-approved case series of patients with refractory VT (ENCORE-VT NCT02919618). Patients without contraindication underwent LGE-CMR and blood draws at three timepoints: before treatment, 3 days, and 3 months after treatment. Left ventricle (LV) scar burden was assessed using semi-automatic contouring (Medis, Netherlands), blinded to location of radioablation. Global and segmental scar burden (%) was compared across timepoints. Segments targeted for radioablation (25 Gray) were compared to surrounding and off-target segments. Blood samples were analyzed for high-sensitivity troponin-I (Tn-I, marker of myocyte injury) and galectin-3 (Gal3, marker of fibroblast activation and fibrosis).

Results: 7 patients were included for analysis: mean age 64 years, 14% female, 57% nonischemic cardiomyopathy, 86% with history of VT storm, mean LVEF 32% (range 19-58%). Mean number of cardiac segments targeted for radioablation was 4 (range 3-8), resulting in mean cardiac treatment volume (CTV) 29 cm³ and planning treatment volume (PTV) 114 cm³. Mean scar burden at baseline was 49% (range 29-68%). Changes in scar burden at 3 days and 3 months were -0.4% (IQR 5 -5.5%) and 3.3% (IQR 3%). Segment-by-segment analysis (Figure 1) showed no significant scar progression in segments targeted for radioablation (mean 68% to 68% to 71%), segments surrounding the target (43% to 44% to 47%), or off-target segments (44% to 42% to 46%). Serum Tn-I and Gal3 were not significantly...
changed (Figure 2). Compared to VT burden before treatment, all 7 patients had substantial reduction 6 months after treatment (4 had > 95% burden reduction, 1 had resolution of incessant slow VT).

**Conclusion:** Despite improvement in VT burden, there was no appreciable cardiac injury or replacement fibrosis after CRA with 25 Gray. The mechanism of early VT control with cardiac radioablation is not myocyte injury or fibrosis.

**CA-533-03**

**STEREOTACTIC BODY RADIOTHERAPY FOR REFRACTORY VENTRICULAR TACHYCARDIA: THE OVERALL CZECH EXPERIENCE**

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**Background:** Catheter ablation (CA) is a well-established treatment strategy for the management of drug-refractory ventricular tachycardia (VT) in patients with structural heart disease. Stereotactic body radiotherapy (SBRT) was proposed recently as a treatment option for cases of failed CA.

**Objective:** This study reports overall experience with the SBRT from two Czech centers.

**Methods:** Since 2014, we enrolled consecutive patients who underwent at least one prior CA for recurrent scar-related VT and had subsequent VT recurrences due to inaccessible substrate. Single-session SBRT for VT was performed without the use of general anesthesia or sedation. A dose of 25 Gy was delivered.

**Results:** The study investigated 33 patients (3 women) with a mean age of 66 ± 9 years. Underlying heart disease was ischemic (58%) and nonischemic (39%) cardiomyopathy; one patient had large cardiac fibroma. The mean left ventricular ejection fraction was 31 ± 8%. Seventy-six percent of patients were on amiodarone. Before SBRT, they underwent a median of 2 (IQR: 1-3; range: 1-5) CA that included epicardial access in 42% of patients. Following SBRT, they underwent a median of 2 (IQR: 1-3; range: 1-5) CA that included epicardial access in 42% of patients. Following SBRT with a planned target volume of 42.6 ± 22.8 ml, the immediate effect was not observed in any patient, VT burden gradually decreased over weeks or months. Seventeen (52%) patients died (2 of them suddenly) during the mean follow up of 29 ± 23 months mainly due to the progression of heart failure (Figure 1). One patient died due to bleeding associated with esophagopericardial fistula that developed 9 months after SBRT. Overall, the number of DC shocks after a single procedure decreased significantly from 0.9 ± 1.9 per month in the period of 6 months before SBRT to 0.1 ± 0.3 per month in the period of 6-12 months after SBRT (P=0.008, Figure 2). However, 14 patients (42%) had to undergo additional CA due to VT recurrences at a mean interval of 13 ± 14 months after SBRT. Three patients underwent repeated SBRT (after 3, 29, and 38 months), which was successful in 2 of them.

**Conclusion:** SBRT in patients with refractory VT is feasible but the long-term mortality after the procedure is high and reflects mainly the severity of the underlying disease. The treatment effect of SBRT is delayed and additional CA is often necessary for VT suppression. At present, SBRT should be offered only as a bailout procedure for otherwise intractable VT.

**CA-533-04**

**SAFETY AND EFFICACY OF CARDIAC RADIOABLATION VERSUS REPEAT CATHETER ABLATION FOR HIGH-RISK REFRACTORY VENTRICULAR TACHYCARDIA**

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**Background:** Cardiac radioablation (CRA) is an emerging treatment for high-risk refractory ventricular tachycardia (VT). A direct comparison of safety and efficacy of CRA versus repeat catheter ablation (CA) has not yet been performed.