Linac Based STereotactic Arrhythmia Radioablation (STAR) of Ventricular Tachycardia: A Case Report

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Objectives: The STereotactic Arrhythmia Radioablation (STAR) was recently introduced to treat ventricular tachycardia (VT). With precise high-dose of radiation to arrhythmic myocardial substrates, STAR could become more than an option in the next future. We reported data regarding the first patient treated with Linac-based STAR in Italy.

Methods: A 67-year-old man with ischemic cardiomyopathy and low ejection fraction (25%) who developed electrical storm was treated. Catheter ablation was hampered due to left ventricular apical aneurism with thrombosis. The cardiac surgeon considered the intervention not feasible due to excessive risk. VT was treated with STAR. ECG during ventricular ectopies (VEs) and VT were analysed to localize the myocardial interest region. Furthermore, the myocardial arrhythmic substrate (fibrotic area) was defined analysing vitality data obtained by cardiac-gated CT, SPECT and PET-CT. The interest region was located in the inferior region of mid interventricular septum. A 4-D computed tomography scan (2 mm slice thickness) was obtained with patients in the supine position using a personalized immobilization device, including Vac-lock, to evaluated cardiac and respiratory motion. A dose of 25Gy in one fraction was prescribed to the planning target volume (PTV). Treatment plan was generated with volumetric modulated arc therapy. IGRT (image guided radiotherapy) and SGRT (surface-guided radiotherapy) were used to reduce set-up error and to monitoring patients during fraction. The treatment plan was delivered in 6 minutes.

Results: Patient was treated on 6 September 2019. No acute side effects were documented. At 1 month FU, the intracardiac defibrillator did not record VTs. The VEs decreased from 24000/24h to 123/24h.

Conclusions: STAR may be useful in patients with VT not suitable for catheter ablation. Further studies are needed to evaluate the safety and clinical benefits of this procedure.