

## Causes of recurrences after stereotactic radio-ablation for refractory ventricular tachycardia

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**Introduction:** Stereotactic radio-ablation (STAR) has been recently introduced for the management of ventricular tachycardia (VT) refractory to antiarrhythmic drugs (AADs) and catheter ablation (CA). The incidence and mechanisms of VT recurrences after STAR remain unknown. We report causes of recurrence in patients (pts) after STAR.

**Methods:** From 09.2017 to 01.2020, 12pts suffering from refractory VT were enrolled. The underlying cardiopathy was ischemic in 3, inflammatory in 3 and idiopathic in 6 pts. Before STAR, an invasive electro-anatomical mapping (Carto3) of the VT substrate (VT-sub) was performed. A mean dose of  $22\pm 2$ Gy was delivered to the VT-sub using the Cyberknife® system.

**Results:** The ablation volume was  $24\pm 7$ cc and involved the interventricu-

lar septum (IVS) in 10. After a median follow-up of  $9\pm 7$  months, VT burden decreased by 78% (mean value, from 89 to 20 VT/semester). Out of the 12 pts, 9 (75%) presented some form of VT recurrence (table): 1) that spontaneously resolved in 2 pts; 2) remote from the VT-sub in 2 cases; 3) managed with AADs that had failed before STAR in 2 cases; 4) within the treated VT-sub in 3 cases. In the latter 3 cases, one recurrence came from a site adjacent to the circumflex artery (mean dosis 14.4 Gy), and two were located within the treated IVS (one displaying marked fibrosis, and one with sarcoidosis). Only 4/12 (33%) pts required additional CA.

**Conclusion:** STAR led in our patients to a strong VT burden reduction. Recurrences occurred at sites remote from the irradiated volume, within the IVS or in under-dosed sites adjacent to critical structures.

Overview of STAR pts and recurrences

Case	STAR Localization	VT recurrence	Recurrence localization	Treatment	Dose at recurrence (Gy)
1	IVS	No	–	–	–
2	IVS	Yes	Ant. basal LV	CA	8.2 (3.6–15.2)
	IVS + inf. basal LV	Yes	ICD rec. only	None	–
4	IVS + ant. basal LV	Yes	Inf. basal LV	CA	21.7 (17.8–23.3)
5	LV apex	Yes	ICD rec. only	None	–
6	IVS	Yes	ICD rec. only	AAD	–
7	IVS + ant. basal LV	Yes	ICD rec. only	AAD	–
8	Ant. basal LV	Yes	Near Cx art.	CA	14.4 (9.9–20.2)
9	IVS + inf. basal LV	Yes	Post. lat. basal LV	CA	3.4 (1.2–17.6)
10	IVS + RVOT	No	–	–	–
11	IVS + ant. basal LV	No	–	–	–
12	IVS + ant. basal LV	Yes	Inf. basal IVS	AAD	19.5 (9.3–23.4)

LV, left ventricle; rec., recording; Cx art., circumflex artery.