CO.11.02

ANATOMICAL ISTHMUSES AND RIGHT VENTRICULAR ELECTROPHYSIOLOGIC EVALUATION IN PATIENTS WITH REPAIRED TETRALOGY OF FALLOT BEFORE PULMONARY VALVE REPLACEMENT

Gianluca Mirizzi [1], Pietro Paolo Tamborrino [2], Lorenzo Ridolfi [2], Andrea Rossi [1], Umberto Startari [1], Luca Panchetti [1], Silvia Garibaldi [1], Martina Nesti [1], Pierluigi Festa [1], Lamia Ait-Ali [1], Giuseppe Santoro [1], Chiara Marrone [1], Nadia Assanta [1], Marcello Piacenti [1]

[1] *Fondazione Toscana Gabriele Monasterio, Pisa/Massa, ITALY*

[2] *Azienda Ospedaliera Universitaria Pisana, Pisa, ITALY*

Introduction: Adults with repaired tetralogy of Fallot (rToF) are prone to develop ventricular tachycardia (VT) in adulthood, due to reentry related to slowly conducting anatomical isthmuses (SCAI). Pulmonary valve replacement (PVR) in patients without history of VT, may lead to obliteration of unrecognized SCAI with subsequent catheter ablation failure; electrophysiologic study is thus recommended before PVR. A systematic evaluation of the topology of SCAI in this population is, however, scant.

Methods: Consecutive rToF patients undergoing PVR were studied with pre-PVR EPS. Electroanatomical mapping with systematic evaluation of all possible anatomical isthmuses (AI; pacemapping, activation mapping in sinus/paced rhythm and bipolar voltage mapping) was performed (AI1: anterior scar/patch to tricuspid annulus; AI2: anterior scar to pulmonary annulus; AI3: pulmonary annulus to ventricular septal defect – VSD- patch; AI4: VSD to tricuspid annulus). Conduction velocity (CV) across all documented AI was calculated (ratio between the distance among the nearest point with bipolar voltage >1.5 mV and their difference in activation timing). Ventricular programmed stimulation was performed at 2 sites with three extrastimuli until refractoriness or induction, during baseline and isoproterenol infusion. Radiofrequency catheter ablation (RFCA) was performed in all patients with inducible VT and/or SCAI, aiming at conduction block across the SCAI validated with differential pacing.

Results: Between May 2023 and April 2024, 11 patients with rToF, 1 double outlet right ventricle and 1 pulmonary atresia were studied (73% males, age 46±10 years; 54% with a previous shunt, 46% with a previous transannular patch, 27% pulmonary valvotomy and infundibular boring; median age at surgery 4 years, interquartile range 3-6). EPS was positive for inducible VT in 4 patients (mean cycle length 297 ms, 3 with left bundle branch morphology and 1 right bundle branch morphology, all inferior axis) and polymorphic VT in 1. AI1 was present in 5 patients, AI2 in 5, AI3 in 7, AI 4 in 2. At least 1 SCAI was present in 7 patients (64%), 2 SCAI in 3 patients (43% of patients with SCAI; in every patient SCAI3+SCAI2 in 2 and SCAI 4 in 1 patient). There were no SCAI1; there were 3 SCAI 2 (mean CV 0.43 m/s), 4 SCAI 3 (mean CV 0.3 m/s), 1 SCAI 4 (CV 0.4 m/s). RFCA was performed in 8 patients; acute success was achieved in all patients, achieving bidirectional conduction block across treated SCAI and non-inducibility of VT.

Conclusions: SCAI are often present in rToF candidate to PVR and without clinical history of spontaneous VT, involving prevalently SCAI3 and SCAI2. Inducible VT is not sufficient as a marker of arrhythmic risk and SCAI should be better sought for.