

**COHERENT MAPPING OF ATRIAL TACHYCARDIAS IN PATIENTS WITH CONGENITAL  
HEART DISEASE**

Klehs Sophia<sup>1</sup>, Paech Christian<sup>1</sup>, Bertagnolli Livio<sup>2</sup>, Markel Franziska<sup>1</sup>, Gebauer Roman<sup>1</sup>

<sup>1</sup>Department for Pediatric Cardiology, University of Leipzig - Heart Center, Leipzig, Germany

<sup>2</sup> Department for Cardiology, University of Leipzig - Heart Center, Leipzig, Germany

Presenting author:

Sophia Klehs, MD

Department for Pediatric Cardiology

University of Leipzig - Heart Center

Strümpellstr. 39

04289 Leipzig

Germany

Phone: 0049- 341-865-1036 / 0049-176-96869329

FAX: 0049- 341-865-1143

Email: [sophia@klehs.de](mailto:sophia@klehs.de)

Abstract:

Objectives: Atrial tachycardias (AT) in patients with congenital heart disease (CHD) are significantly contributing to morbidity and mortality. Identification of critical conduction isthmuses is difficult in this patient population. Coherent mapping uses a new algorithm to identify areas of electrical discontinuity and displays conduction velocity vectors to better identify critical sites for ablation. We analyzed our experience of ablation of AT with this new technology.

Methods: All patients with CHD who had Coherent mapping of AT using the high-density mapping PENTARAY™ catheter and three-dimensional electroanatomic mapping system Carto 3 between June 2019 and June 2021 were included retrospectively (n=27). As a control group 27 patients with CHD and mapping of AT without coherence between Mars 2016 and June 2019 were included.

Results: 54 ablation procedures were performed in 42 patients (median age 35 (IQR 30-48) years, 17 female patients). 64 AT were induced and mapped. 50 AT were intraatrial reentrant tachycardia (thereof 21 CTI-dependent) and 14 AT were ectopic AT. Median procedure duration was 180 (120-214) min and median fluoroscopy time was 10 (5.2-14) min. Substrates were located in the right atrium / systemic venous atrium in 24 procedures, located in the left atrium / pulmonary venous atrium in 12 procedures and located in both atria in 18 procedures. Acute success was 100% (27/27) in the Coherence group and 74% (20/27) in the Non-Coherence group (p=0.01). During the follow-up (median 26 (12-45) months) AT recurred in 28/54 patients, thereof 15 patients needed a re-ablation procedure. Log-rank test showed no difference in recurrence rate between the two groups (p=0.29). 3 minor complications occurred (5.5%).

Conclusion: Coherent mapping of AT using high density mapping PENTARAY™ catheter showed excellent results regarding acute success of catheter ablation. Coherent mapping simplified the identification of critical slow conducting isthmuses as a target for catheter ablation of AT in this patient cohort with a high percentage of scar-related ATs.

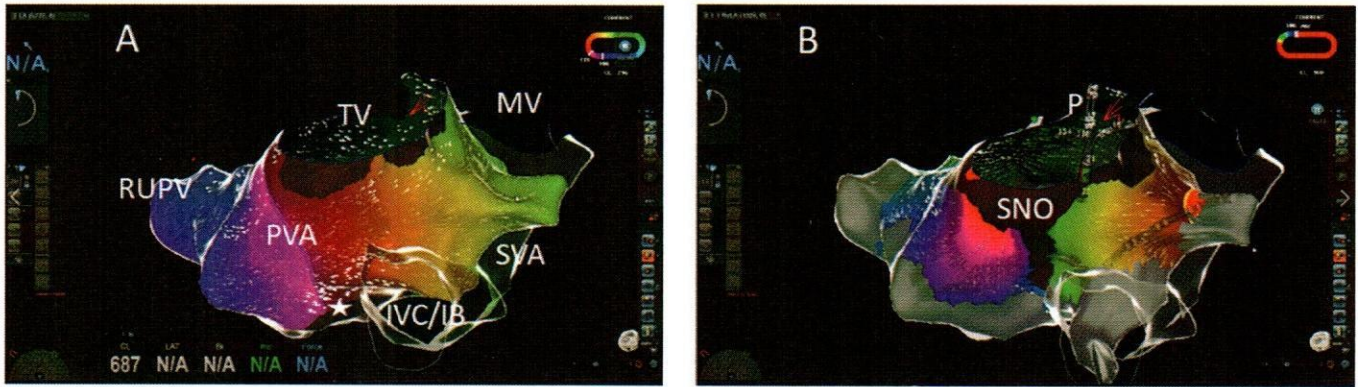
Word count: 312 words

	All Procedures (N=54)	Coherence (N=27)	No Coherence (N=27)	P-Value
Median age (IQR) [years]	35 (30-48)	35 (31-54)	37 (29-48)	P=0.76
Median body weight (IQR) [kg]	80 (66-93)	80 (64-99)	79 (67-92)	P=0.67
Number complex CHD (%)	27 (50%)	19 (70%)	8 (30%)	<b>P=0.006</b>
Median fluoroscopy time (IQR) [min]	10 (5.2-14)	12 (4-15)	9 (7,3-.3)	P=0.84
Median procedure duration (IQR) [min]	180 (120-214)	180 (150-240)	150 (120-210)	<b>P=0.047</b>
Tachycardia Mechanism				
IART	50 (78%)	25 (86%)	25 (71%)	P=0.31*
IART CTI-dependent	21 (42%)	14 (56%)	7 (28%)	P=0.12#
IART non-CTI-dependent	29 (58%)	11 (44%)	18 (72%)	
EAT	14 (22%)	4 (14%)	10 (29%)	
Ablation				
RA/SVA only	24 (44%)	10 (37%)	14 (58%)	P=0.5
LA/PVA only	12 (22%)	7 (26%)	5 (19%)	
RA/SVA and LA/PVA	18 (33%)	10 (37%)	8 (30%)	
CTI (SVA/PVA)	30 (56%)	18 (67%)	12 (44%)	P=0.1
Ablation time (IQR) [s]	1035 (598-1936)	1380 (600-1929)	899 (591-1957)	P=0.59
Success	47 (87%)	27 (100%)	20 (74%)	<b>P=0.01</b>

**Table: Patients' and procedural characteristics**

\*Comparison between IART and EAT, #Comparison between IART CTI-dependent and IART non-CTI-dependent

*CHD: congenital heart defect, CTI: cavotricuspid isthmus, EAT: ectopic atrial tachycardia, IART: intraatrial reentrant tachycardia, LA/PVA: left atrium/pulmonary venous atrium, RA/SVA: right atrium/systemic venous atrium*



**Figure**

Paused presentation of a Coherent map of the pulmonary venous atrium in LAO-view from below (from the inferior baffle) in a patient after Senning procedure for d-transposition of the great arteries. A: Coherent mapping of the tachycardia showed an intraatrial reentrant tachycardia around the tricuspid valve with a critical isthmus between the inferior vena cava / inferior baffle and the tricuspid valve (CTI). Thicker arrows indicate areas with low conduction velocity (white asterisk). B: After completion of a CTI-ablation line and termination of AT, the remap during atrial pacing near to CS ostium showed a completed SNO-Zone and Coherent mapping showed no remaining conduction through the CTI-ablation line.

*IVC/IB: inferior vena cava / inferior baffle, MV: mitral valve, P: PENTARAY™ catheter, PVA: pulmonary venous atrium, RUPV: right upper pulmonary vein, SNO: area of slow or no conduction, SYA: systemic venous atrium, TV: tricuspid valve*