non-obstructive coronary arteries after undergoing coronary angiography were transferred to base hospital and further data on the investigations to ascertain the aetiology of presentation was not available. Also, intracoronary provocation testing and intracoronary imaging was not performed in any of these patients to further clarify coronary cause of presentation.

2 ARRHYTHMOGENIC SUBSTRATE STRATIFICATION OF POSTERIOR LEFT ATRIAL WALL IN ATRIAL FIBRILLATION VERSUS SINUS RHYTHM IN PERSISTENT ATRIAL FIBRILLATION USING AUTOMATED VOLTAGE ANALYSIS

J Mannion, SJ Lennon, J Keane, J Galvin, J O'Brien, G Jauvert, E Keelan, G Szeplaki, U Boles. *Heart and Vascular Centre, Atrial Fibrillation and Cardiovascular Research Institute (CVRI), Mater Private Hospital Dublin, Ireland*

10.1136/heartjnl-2021-ICS.2

Introduction Pulmonary vein isolation (PVI) remains the main procedural target in atrial fibrillation (AF) ablation. The posterior left atrial (LA) wall contains multiple potential mechanisms that can initiate and sustain persistent AF (PeAF) and is frequently considered as an important target of both substrate modification and isolation. Higher scar burden in the posterior wall drives the motivation for this strategy in patients with PeAF, and accurate quantification of scar burden is crucial in deciding on the benefit of posterior wall isolation (PWI).

Study Aim To analyse and quantify low voltage area (LVA) burden on the posterior wall in PeAF and analyse the effect of mapping rhythm on LVAs.

Methods We retrospectively selected patients undergoing de novo ablation for PeAF with no additional lines. Patients had failed at least one antiarrhythmic drug. We selected a standardised procedure of initial mapping in AF, followed by repeat mapping in SR post PVI. Each map required ≥ 1000 voltage points in AF and SR. Each atrial map was split into 6 anatomical segments for regional comparison, including the Posterior, Anterior, Lateral, Septal, Roof and Floor anatomical segments. We removed the mitral annulus, trans-septal puncture site and pulmonary veins from analysis (figure 1). Each segment was analysed using an automated Voltage Histogram Analysis tool (VHA) to categorise endocardial area into 10 voltage ranges between 0-0.5mV (figure 1). Voltage categories

≤ 0.2 mV were assigned as 'Dense Scar' and categories 0.21-0.5mV designated 'Diseased LA Tissue'. Output data were analysed with SPSS v.26.

Results The posterior wall had significantly higher burden of Dense Scar (≤ 0.2 mV) points when mapped in AF (AF=234 mm² $\pm$ 150.45, SR=138.27mm² $\pm$ 112.3, $p < 0.001$), while all other walls were comparable in this range (table 1). The inter-rhythm difference between anatomical segments was much greater at voltages 0.21-0.5mV, with significant differences in all segments except for the roof and the floor (figure 2). The greatest observed difference between rhythms in this range

Abstract 2 Figure 1 Example of posterior anatomical segment VHA analysis

Figure 1: Example of fast anatomical map prior to analysis (Top image). The second image (Bottom Image) is an example analysis of the anterior anatomical segment, by temporary removal of other anatomical segments in addition to the trans-septal puncture site, mitral annulus and pulmonary veins. An example voltage histogram analysis table has been generated based on this segment voltage, to the right.

Abstract 2 Table 1 Table demonstrating mean LA wall LVA identified in different voltage ranges when mapped in different rhythms
Table 1: Comparison of LVA burden of the Poster Wall, followed by each anatomical segment when mapped in SR and AF. The mean area difference between rhythms, in mm², is displayed in addition to percentage difference.

Anatomical Segment	LVA Burden ≤ 0.2 mV (mean area $\pm$ SD mm ²)				LVA Burden 0.21-0.5mV (mean area $\pm$ SD mm ²)			
	SR	AF	Mean Difference (%)	P value	SR	AF	Mean Difference (%)	P value
Posterior	102.14 $\pm$ 157.47	159.03 $\pm$ 194.65	56.89 (55.7%)	0.02*	138.27 $\pm$ 112.28	234 $\pm$ 150.45	95.73 (69.2%)	<0.001*
Lateral	70.5 $\pm$ 80.00	90.57 $\pm$ 117.99	20.07 (28.5%)	0.36	87.52 $\pm$ 66.82	137.05 $\pm$ 104.99	49.53 (56.5%)	<0.001*
Anterior	131.8 $\pm$ 169.53	126.5 $\pm$ 154.57	5.3 (4%)	0.85	158.53 $\pm$ 99.22	220.87 $\pm$ 173.07	62.34 (39.3%)	0.002*
Roof	82.72 $\pm$ 117.32	83.68 $\pm$ 113.56	0.96 (1%)	0.95	115 $\pm$ 77.14	150.61 $\pm$ 93.17	35.61 (31%)	0.01*
Floor	105.1 $\pm$ 134.91	106.42 $\pm$ 148.67	1.32 (1.2%)	0.96	117.62 $\pm$ 85.41	151.2 $\pm$ 110.07	33.58 (28.5%)	0.052
Septal	80.99 $\pm$ 89.03	74.16 $\pm$ 87.59	6.83 (8.4%)	0.68	99.123 $\pm$ 73.62	115.37 $\pm$ 84.83	16.25 (16.4%)	0.18

*Denotes significance. LVA = Low Voltage Area; SR = Sinus rhythm; AF= Atrial Fibrillation.

Abstract 2 Figure 2 Bar chart comparing LVA burden in both SR and AF

Figure 2: Bar chart representing the absolute values of low voltage areas (mm²) mapped in each anatomical segment indicating a remarkable difference in Posterior LA wall compared to other anatomical segments. The left graph demonstrates Dense Scar and the right graph Diseased LA Tissue as per predefined voltage criteria. *Denotes significance. LVA=Low voltage area; LA= Left Atrium; SR=Sinus Rhythm; AF=Atrial Fibrillation.

was observed on the posterior wall, once again with the highest correlation of all segments ($R=0.314$, $p=0.015$).

Conclusions The automated VHA tool demonstrated the posterior wall as the only anatomical segment to be significantly higher in LVAs consistent with dense scar burden (i.e. ≤ 0.2 mV), when mapped in AF. Mapping rhythm has a substantial impact on surrogate readings of both 'Diseased Tissue' 0.21-0.5mV and 'Dense Scar' ≤ 0.2 mV on the posterior wall. These findings mandate careful interrogation of posterior wall voltages and may partially explain the debated outcome for posterior wall ablation. It is best interrogated in both rhythms to confirm the presence of arrhythmogenic substrates over artifactual rhythm effect.

3

ATRIAL UPTAKE ON TECHNETIUM PYROPHOSPHATE SCINTIGRAPHY: CLINICAL IMPLICATIONS OF THIS NEW PHENOMENON

^{1,2}M Hussain, ²M Hanna, ²E Donnellan, ²A Krywanczyk, ²O Abou Hassan, ²T Martyn, ²S Alkharabsheh, ^{1,2}C Watson, ²C Tan, ²ER Rodriguez, ²WH Wilson Tang, ²D Kwon, ²P Cremer, ²B Griffin, ²F Cheng, ²M Kanj, ²W Jaber, ^{1,2}P Collier. ¹Queen's University Belfast, UK; ²Cleveland Clinic, USA

10.1136/heartjnl-2021-ICS.3

Transthyretin cardiac amyloidosis (ATTR-CA) is an increasingly recognized disease in which atrial fibrillation (AF) has been shown to be highly prevalent. 99m-Technetium pyrophosphate (99mTc-PyP) scanning is used to non-invasively make the diagnosis of ATTR-CA. Assessment of atrial wall uptake (AU) on 99mTc-PyP is currently not utilized in the clinical setting. We hypothesize that AU by 99mTc-PyP is associated with higher rates of AF, and AU corresponds to atrial wall infiltration by TTR fibril deposition. All patients that underwent consecutive 99mTc-PyP at our institution for suspected ATTR-CA from January 2012 to September 2019 were included. Presence or absence of AU was assessed visually using Corridor 4DM software (v2015) using fused/composition computed tomography-single photon emission computed tomography (SPECT) imaging in all cases (figure 1). ATTR-CA diagnosis was defined using institutional guidelines. Patient characteristics were obtained through electronic medical records. Retrospective review of the patient population identified those who had left atrial tissue available from heart transplantation, left atrial resection or autopsy to allow for direct tissue-imaging correlation (figure 1). A total cohort of 580 patients were identified (table 1). 164 (28%) patients had scans consistent with ATTR-CA. 296 (51%) had a diagnosis of AF. 117 (20%) patients had AU. Table 2 shows the relative interaction of AU, ATTR-

Abstract 3 Figure 1 99m-Technetium pyrophosphate scan (99mTc-PyP) illustrating atrial uptake (AU) in patients with/without a clinical diagnosis of transthyretin cardiac amyloidosis (ATTR-CA) with histopathological correlation.

Caption:

A: Left atrial appendage resection specimen in a patient AU+, ATTR-CA- with Congo red stain (40x) showing apple-green and orange birefringence (arrow), confirming the material is amyloid.

B: 99mTc-PyP scan showing AU+ in a patient ATTR-CA-.

C: 99mTc-PyP scan showing AU- in a patient ATTR-CA-.

D: Left atrial appendage resection specimen in a patient AU+, ATTR-CA+ with immunohistochemistry positive for TTR (20x). Brown staining visible in the amyloid nodules (arrow).

E: 99mTc-PyP scan showing AU+ in a patient ATTR-CA+.

F: 99mTc-PyP scan showing AU- in a patient ATTR-CA+.