ABSTRACT EN-571: #HRS2022 YIA Competition - Clinical EP Finalists

Friday, April 29, 2022
10:30 AM - 11:30 AM

EN-571-01

THE VALUE OF PROGRAMMED VENTRICULAR EXTRASTIMULI FROM THE RIGHT VENTRICULAR BASAL SEPTUM DURING SUPRAVENTRICULAR TACHYCARDIA

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Background: The difference between a right ventricular (RV) apical stimulus-atrial electrogram (SA) during reset of supraventricular tachycardia (SVT) vs. the ventriculoatrial interval during SVT (ΔSA-VA) is an established technique for discerning SVT mechanisms but is limited by significant diagnostic overlap.

Objective: We hypothesized that ΔSA-VA intervals from the RV basal septum (ΔSA-VA_base) would be shorter than from the RV apex for atrioventricular reciprocating tachycardia (AVRT) and would show the opposite effects to that of atrioventricular nodal re-entrant tachycardia (AVNRT) (Figure 1).

Methods: In this multicenter prospective study, all AVNRT and AVRT patients underwent programmed ventricular extrastimuli (V2) delivered from both the RV basal septum and RV apex. Both the ΔSA-VA_base and ΔSA-VA_apex were calculated when V2 clearly reset the tachycardia.

Results: The V2 technique was successfully performed from both sites in 105 AVNRT (age 48 ± 20, 44% male) and 130 AVRT (age 26 ± 18, 54% male) patients. The ΔSA-VA_base was shorter than the ΔSA-VA_apex during AVRT (44 ± 29 vs. 58 ± 29 ms, p < 0.001), and the opposite occurred during AVNRT (133 ± 31 vs. 125 ± 25 ms, p = 0.03). A ΔSA-VA_base of ≥ 85 ms had a sensitivity of 97% and specificity of 98% for identifying AVNRT (area under the receiver operating characteristic curve: 0.988, 95% confidential interval 0.974-1.000). Furthermore, a ΔSA-VA_base of 45-85 ms allowed identifying AVRT with left free wall APs (sensitivity 88%/specificity 95%), 20-45 ms for posterior septal APs (sensitivity 83%/specificity 96%), and <20 ms for right free wall or anterior/mid septal APs (sensitivity 86%/specificity 99%) (Figure 2).

Conclusion: The ΔSA-VA_base during V2 produced a more robust differentiation between AVNRT and AVRT compared with the ΔSA-VA_apex. The ΔSA-VA_base of ≥ 85 ms proved to be excellent for the differentiation of all AVNRT from AVRT regardless of the AP location. Furthermore, this straightforward technique allowed localizing four general AP locations with a high sensitivity and specificity.

EN-571-02

SCREENING FOR PUTATIVE PATHOGENIC VARIANTS IN DILATED CARDIOMYOPATHY GENES IDENTIFIES EARLY DISEASE AND PREDICTS MORTALITY

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Background: Dilated cardiomyopathy (DCM) can present with the sentinel event of sudden cardiac death, as well as heart failure, ECG abnormalities, atrial fibrillation or stroke. Data are limited regarding genetic screening and the mortality associated with DCM in a general population.

Objective: Using the UK Biobank, we aimed to determine the mortality and clinically relevant outcomes associated with putative pathogenic variants (PuPV) in DCM genes.

Methods: Cohort study design using whole exome sequencing; variants in 44 ClinGen-curated DCM genes were annotated using REVEL (≥ 0.65) and ANNOVAR (predicted loss of function) to identify PuPVs and assign individuals to the genotype-positive (G+) or genotype-negative (G− [controls]) cohorts. Group comparisons were made using time-to-event analysis to investigate mortality and composite outcomes of DCM, heart failure, arrhythmia, and stroke.

Results: In 200,619 participants, PuPV in DCM genes were identified in 16,674 (8.3%) individuals (G+). G+ and G− had similar proportion of females (54.6% vs 55.1%; p = 0.23). G+ participants were slightly younger (56.3 vs 56.5 years; p = 0.003). Of G+, 1703 (10.2%) had subclinical DCM and 84 (0.5%) had clinical DCM. G+ had increased mortality (HR 1.08 [95% CI 1.01 - 1.15]) and increased risk of developing the composite outcomes (HR 1.11 [95% CI 1.06 - 1.16]).
Conclusion: Adults with PuPV in 44 DCM genes have higher all-cause mortality and increased risk of developing DCM-associated features and complications, compared to G- controls.

EN-571-03

RISK STRATIFICATION OF PATIENTS WITH BRUGADA SYNDROME BY NON-INVASIVE HIGH DENSITY ELECTROCARDIOGRAPHIC MAPPING SYSTEM

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Background: Risk stratification in patients affected by Brugada syndrome is a crucial moment for the therapeutic management, as this pathology is increasingly diagnosed in young subjects without further comorbidities.

Objective: To provide a risk stratification in patients affected by Brugada syndrome that can relies on clinical and electrophysiological data at the same time.

Methods: We reported our single-Centre experience from January 2016 to October 2021; all consecutive patients with Brugada Syndrome undergoing non-invasive high-density electrocardiographic mapping were included in the study. We defined the correlation between the clinical risk factors and the extension of the pathological substrate in patients with Brugada syndrome analyzed by non-invasive high density electrocardiographic mapping system and a new generation software developed for the post-processing analysis.

Results: In patients with spontaneous Brugada type 1 ECG pattern, the pathological substrate areas were always larger than the patients without spontaneous pattern; the results were statistically significant during stress test (3.63 ± 3.75 vs 15.57 ± 11.16; p = 0.00024) and after Ajmaline administration (12.61 ± 11.3 vs 25.74 ± 20.02; p = 0.04). In patients with familiarity for first-degree relatives SCD before 35 y.o. the areas were on average wider, in the baseline this difference was statistically relevant (3.66 ± 5.46 vs 10.33 ± 10.51; p = 0.03). In patients with aborted SCD the average of the areas was always larger than in patients who did not present this risk factor, with statistically significant results at baseline (4.76 ± 6.75 vs 17.29 ± 13.58; p = 0.04) and after pharmacological induction with Ajmaline (11.61 ± 10.04 vs 35.49 ± 17.23; p = 0.0003).

Conclusion: Latest generation technologies such as non-invasive high-density electrocardiographic mapping systems can represent a new frontier in the study of BrS patients, through the identification and measurement of pathological areas and their correlation with the patient's clinical history and risk factors; moreover, this technology provide a valuable aid in the pre-procedural study of high-risk patients by identifying the pathological areas that will be subject to ablation.