23 patients, mean localization accuracy was 5.9±2.6mm for 26 VT exit and PVC origin sites (Figure 1). There was no difference in mean localization error in epicardial sites compared to endocardial sites using the AAOL system (6.0 *vs.* 5.8 mm, P =0.895). Figure 1 shows an example of VT exit site localization.

Conclusion: The AAOL system achieved accurate localization of VT exit/PVC origin sites in patients with SHD that is superior to current system, which supports the potential clinical utility.

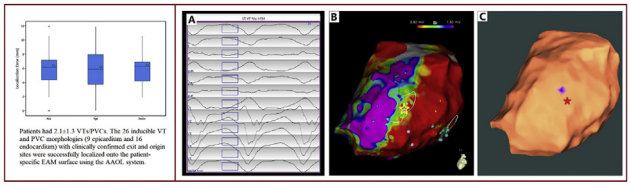

Figure 1 (Left panel) shows box plot of localization errors between clinically-identified VT exit/PVC origin sites and sites estimated by the AAOL in a prospective cohort. The ALL plot represents the aggregate of all VTs and PVCs. Epi indicates epicardial VTs and PVCs; and Endo indicates endocardial VTs and PVCs. (Right panel) (A) shows the recorded 12-lead ECG of an induced epicardial VT during the procedure for a patient. (B) illustrates the epicardial EAM bipolar potential map of the LV for this patient, with the VT exit site (identified by contact mapping) depicted by the yellow star. (C) shows that the AAOL system was used to predict a VT exit site marked in the blue patch on the apical inferolateral LV wall of the epicardial EAM geometry when using all recorded 9 pacing sites of the VT, having a localization error of 8.2 mm in comparison with the actual VT exit site indicated by the red star.

B-PO01-091

PREDICTORS OF CONCEALED MYOCARDIAL SCAR ON CARDIAC MAGNETIC RESONANCE IN PATIENTS WITH APPARENTLY IDIOPATHIC VENTRICULAR ARRHYTHMIAS: THE ALARM RISK SCORE

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Background: In patients (pts) with apparently idiopathic ventricular arrhythmias (VAs), cardiac magnetic resonance (CMR) with late gadolinium enhancement (LGE) may reveal concealed myocardial scar which increases the arrhythmic risk during follow-up. However, systematic implementation of CMR for pts with idiopathic VAs is costly and impractical, and criteria to refine patient selection are needed.

Objective: To create a scoring system based on clinical and VAs characteristics to refine the pts selection for CMR imaging.

Methods: 815 consecutive pts (61% males, median age 45 [31-55] years) with apparently idiopathic non-sustained VA (normal 12-lead ECG and normal echocardiogram) underwent CMR. Clinical characteristics as well as VAs features (burden, morphology and QRS fragmentation) were collected. To develop the scoring system predicting the presence of CMR abnormalities, we divided the pts into 2 datasets: 572 (70%) randomly selected pts were used to generate the score (derivation set), and 243 (30%) were used for its validation. The risk score was created from the odds ratio (OR) obtained at multivariable logistic regression analysis rounded to the nearest integer.

Results: Left-ventricular LGE was documented in 126 (16%) pts. The ALARM risk score was derived from the independent predictors of LGE at multivariable analysis: Age ≥30-years (3 points, p=0 006), maLe sex (5 points, p<0 001), fAmily history of sudden death/cardiomyopathy (2 points, p=0 04), RBBB-superior axis morphology (7 points, p<0 001) and Multifocal VAs (8 points, p<0 001). The ALARM score ranged from 0 to 25 The score C-statistics were 0 84 (p=0 02), 0 82 (p=0 04), and 0 83 (p=0 02) for the derivation set, validation set, and all pts, respectively. The probability of CMR abnormalities ranged from 3% for the first tertile of score (<5 points), to 11% for the second tertile (5-8 points), and 47% for the third tertile (≥8 points).

Conclusion: The ALARM risk score based on patient characteristics and VAs feature predicts the presence of CMR abnormalities in pts with apparently idiopathic VAs and helps to identify those to most likely benefit from CMR assessment.

B-PO01-092

USING PULSED ELECTRIC FIELDS TO CAUSE FOCAL FIBROSIS IN THE INTERVENTRICULAR SEPTUM

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Background: Pulse electric fields (PEF) are being investigated as an alternative ablation modality to traditional radiofrequency ablation for modification of myocardial substrate.

Objective: Assess the extent and time course of myocardial scar formation caused by application of PEF at the interventricular septum.

Methods: Four-week survival experiments were performed in 8 canines. Energy was delivered using ablation catheters in bipolar configuration to apply PEF to the septum. Two animals were administered pulses at microsecond pulse widths and six received nanosecond pulses for a total 75-189 J delivered per animal. MRI studies were performed in 4 of the 8 animals. Scar formation was assessed by measuring late gadolinium enhancement (LGE) and confirmed by histology.

Results: Sites of PEF delivery exhibited myocardial edema on triple inversion recovery and early scar with some LGE visible after 7 days. Lesion volumes were larger for transmural configurations vs. bipolar PEF delivered in a single cardiac chamber ($10.7 \pm 2.3\ cm^3$ vs. $2.9 \pm 1.1\ cm^3$). At 30 days, lesions predominantly exhibited LGE and total lesion volumes were similar for both groups ($5.3 \pm 2.4\ cm^3$ vs. $4.0 \pm 0.2\ cm^3$). Transmural MRI lesions were achieved when bipolar electrodes were placed on either side of the septum, and total lesion volume was dose-dependent. Myocardial fibrosis was identified on histology. Bipolar configurations entirely within a chamber produced superficial lesions, even with delivery of higher energy.

Conclusion: Application of PEF to the myocardium can cause substrate modification, including transmural fibrosis. Lesion volume is dose-dependent for transmural electrode configurations.

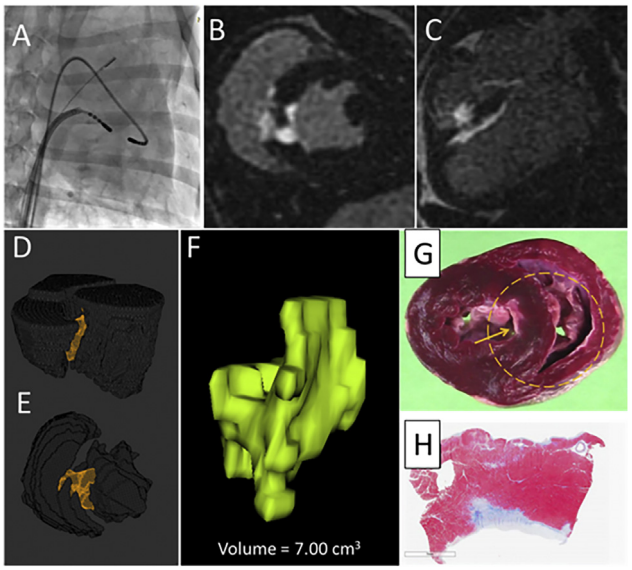

Figure 1. **A)** Fluoroscopic view of catheters positioned in both chambers, on either side of the septum, for transmural delivery of energy by PEF stimulation. **B, C)** Short axis and long axis cardiac MRI views showing transmural late gadolinium enhancement. **D, E)** RAO and LAO views of the three dimensional ventricular cavity reconstructions based on the MRI acquired at 30 days post delivery of PEF energy. The orange region highlights the transmural scar. **F)** 3D reconstructed model of gadolinium-enhancing scar. **G)** Gross pathology section of left and right ventricle at 30 days. Scarred lesions are within the dashed circle, arrow is indicating a dense LV endocardial scar. **H)** Histologic section with Masson trichrome stain showing scar with depth approximately 3.6 mm. Scale bar, 7 mm.

B-PO01-094

ARTIFICIAL INTELLIGENCE (AI) CAN IDENTIFY RISK OF DEATH IN COVID-19 PATIENTS USING 12-LEAD INTAKE ELECTROCARDIOGRAM (ECG) ALONE

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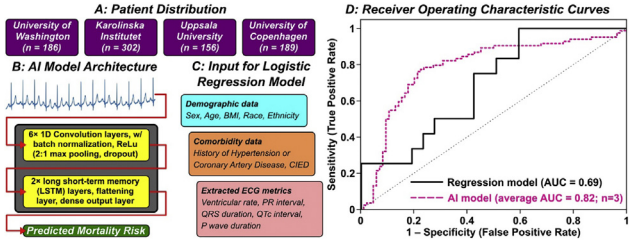
Background: Life-threatening events in COVID-19 are difficult to predict. Risk stratification is encumbered by the need to limit diagnostic imaging and investigations to protect workers. 12-lead ECG may capture subtle signs of myocardial COVID involvement that could help predict lethal complications. We hypothesize that AI can help identify such ECG signatures, which are imperceptible to the naked eye.
Objective: To use intake ECGs from hospitalized COVID-19 patients to train a *deep convolutional neural network AI* model to predict risk of all cause inpatient mortality.
Methods: We studied intake ECGs from 833 COVID-19 patients (61% male, 65±16 years) admitted to four centers between 3/2/20 and 6/8/20 (***A***). Records were labeled by patient outcome (death vs discharge). Labeled ECGs were used to train the AI model (***B***); our settings prioritized model *sensitivity* (i.e., false negatives were penalized). We compared the AI model to a conventional regression model (***C***) developed using demographic, clinical covariates and extracted ECG metrics.
Results: 157 (18.8%) patients died (66% male, 77±13 years). Models were trained, validated, and tested using distinct ECGs in an 8:1:1 split (n = 666:83:84). Over multiple training iterations, the AI model (***D***) predicted risk of mortality with an average area under the curve (AUC) of 0.82 (95% CI: .79-.87) and a negative predictive value of .91 (95% CI: .90-.93). This compared favorably to the regression model (AUC: .69; 95% CI: .54-.85).
Conclusion: Our AI based model predicts hospitalized COVID-19 patients' mortality risk using intake ECG data alone. We hope that this tool can be deployed for rapid clinical triage in resource-constrained settings.



B-PO01-095

IMPACT OF DIGITAL MONITORING ON COMPLIANCE AND OUTCOME OF LIFESTYLE-CHANGE MEASURES IN PATIENTS WITH COEXISTENT ATRIAL FIBRILLATION AND OBESITY

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Background: Obesity, a known risk factor for atrial fibrillation (AF), is potentially reversible through lifestyle changes including diet and physical activity. However, lack of compliance is a major obstacle in attaining sustained weight-loss.
Objective: We investigated the impact of patient engagement using a digital monitoring system, on compliance for lifestyle-change measures and subsequent outcome.
Methods: A total of 106 consecutive patients with coexistent AF and obesity (BMI ≥30) were classified into 2 groups based on the monitoring method; **group 1**: Use of digital platform (n=20) and **group 2**: conventional method (n=85). Group 1 used the RFMx digital monitoring platform (wearable devices connected to a smartphone app) that sets weekly goals for exercise and weight loss, tracks patient- compliance and health data continuously and sends regular text-reminders. Conventional method included monitoring patients' adherence to diet and change in weight during in-person clinic visits or monthly phone calls from staff.
Results: Baseline characteristics of group 1 and 2 respectively were; mean age: 65.7 vs 67.4 years; male: 7 (58%) vs 16 (57%); BMI: 34.5 ± 3.4 vs. 35.0 ± 3.7 At 6 months of follow-up, 12 (60%) and 28 (33%) from group 1 and 2 were compliant with the physician-instructions regarding diet and exercise (p=0.025). Weight loss was observed in 9/12 (75%) from group 1 and 11/28 (39%) from group 2 (p=0.038) and mean