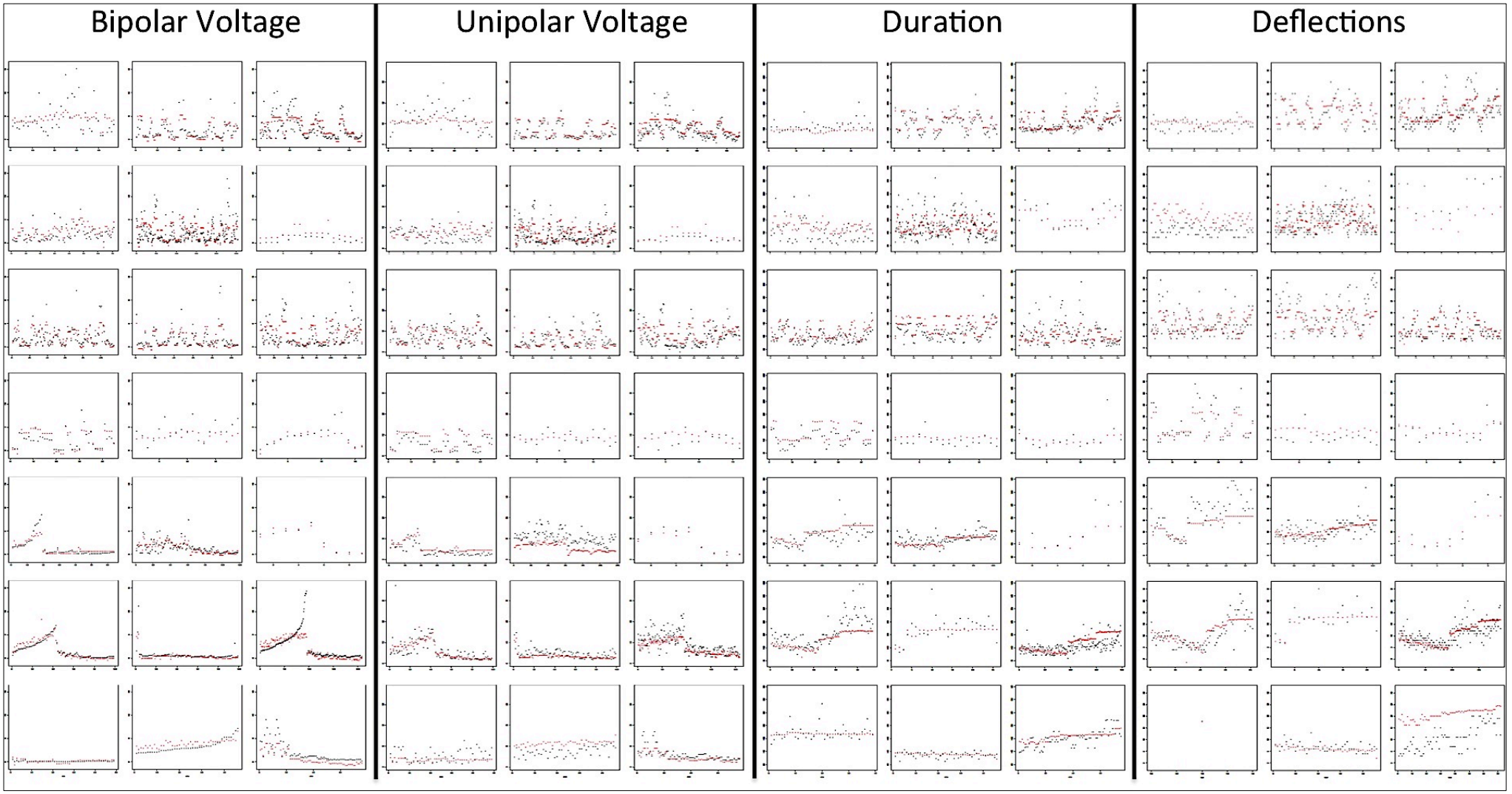
SUPPLEMENTAL MATERIAL

Online Appendix

Supplemental Figure 1 – Leave One Out Cross-Validation Results – Using leave one out cross validation at the patient level, the mean absolute prediction error was 1.04 mV for bipolar voltage, 2.53 mV for unipolar voltage, 3.31 for deflections, and 21.31 msec for duration. The figure summarizes leave one out cross validation results for 21 patients with mapping during sinus rhythm. Four panels corresponding to sequential dependent variables (Bipolar Voltage, Unipolar Voltage, Duration, and Deflections) are shown, each with 21 graphs corresponding to individual patients. Each graph summarizes results for an individual patient with invasively measured data (black dots) and predicted data (red dots). The Y-axis for each graph is Bipolar and Unipolar Voltage amplitude (mV), Duration (ms), or Deflections (#), respectively. The X-axis for all graphs is observation number corresponding to each sampled site. A graph in the Deflection data has only one observation due to significant baseline noise in that subject which precluded accurate analysis of deflections for many points. Despite individual point discrepancies, the trends in predicted data (red dots) closely follow those of the invasively obtained measures (black dots). The absolute error, however, was larger with larger outcome values.


Bipolar Voltage
Unipolar Voltage
Duration
Deflections

Supplemental Table 1. Analyzed Sectors on LGE-CMR and Mapping Points on EAM

Scar Types		All Patients (N=23)	
Intramural Location	Scar Transmurality	LGE-CMR Sectors Analyzed 2690 Sectors	LV EAM Points Analyzed 2093 Points
Normal	0%	1643 (61.1%)	939 (44.9%)
Endocardial	1-25%	110 (4.1%)	86 (4.1%)
	26-50%	218 (8.1%)	178 (8.5%)
	51-75%	230 (8.6%)	324 (15.5%)
Mid Wall	1-25%	15 (0.5%)	16 (0.8%)
	26-50%	31 (1.1%)	32 (1.5%)
	51-75%	14 (0.5%)	2 (0.1%)
Transmural	76-100%	430 (16.0%)	516 (24.7%)

Values are shown as N (%).

LGE-CMR=late gadolinium enhancement cardiac magnetic resonance; LV=left ventricle; EAM=electroanatomic map.

Supplemental Table 2. Results of Electroanatomic Mapping and Catheter Ablation

	ALL (N=23)
Analyzed EAM Points	2093
Low Voltage Area [cm^2] (% of LV Endocardium)	45.5 [32.2-69.6] (25.4 [18.3-33.3])
Dense Scar [cm^2] (% of LV Endocardium)	11.0 [2.6-18.1] (5.0 [1.8-8.9])
Surface Registration Error	2.8 [2.2-3.3]
Number of Induced VT	2 [1-3]
Number of RF Application	16 [15-27]
Critical Sites	39 sites (23 patients)
12/12 Pace-Map	39 (100%)
PPI-VTCL <30msec	9 (23.1%)
Concealed Entrainment	7 (18%)
Complete Success / Partial Success	10 / 13
Procedure Time [min]	373 [340-437]
Fluoroscopy Time [min]	70 [60-92]
Ablation Time [min]	18 [10-26]

Categorical values are represented as numbers and continuous variables as median [interquartile range].

Low voltage area and dense scar on electroanatomic maps (EAM) were defined as areas with <1.5mV and <0.5mV of bipolar voltages, respectively.

RF=radiofrequency; PPI-VTCL=post pacing interval-VT cycle length. Other abbreviations listed with Table 1.

Radiofrequency catheter ablation is a useful to reduce episodes of sustained monomorphic ventricular tachycardia (VT) in patients with implantable defibrillators and prior myocardial infarction. Hemodynamically instability often limits mapping during VT and identification of potential reentry circuit substrate by mapping during sinus or paced rhythm is often used to guide ablation in these patients. We sought to quantify the association of reentry circuit sites with magnetic resonance myocardial image characteristics to gain insights regarding the anatomy of tissues and critical sites that support post-infarct VT. In a series of 23 patients, we found that critical VT sites were associated with >25% scar transmurality and central VT circuit sites were associated with >75% scar transmurality. Additionally, left ventricular wall thickness, post-infarct scar thickness, and intramural scar location were associated with local intra-cardiac electrogram amplitudes, duration and deflections. These findings demonstrate the feasibility of creating non-invasive image based maps prior to the procedure, which can potentially be used to guide VT substrate ablation.