EP4_104

Characteristics of the Electrocardiogram in Patients with Implanted Left Ventricular Assist Devices (LVADs)

Sara Martinez, Jeff Lau, Derrick Fansler, Eric Novak, **Robert Kleiger**, Susan Joseph
Medicine, Cardiovascular Division, Washington University School of Medicine, USA

Patients with LVADs are routinely telemetry monitored and have frequent electrocardiographs performed. However, the ECG changes that occur in these patients remain undocumented. We reviewed ECGs in LVAD patients and defined criteria. We reviewed pre- and post- implantation ECGs of 43 LVAD patients. We identified 6 ECG criteria for presence of an LVAD: low limb-lead voltage (L); ventricular pacing (V); electrical artifact (A); QRS duration > 120 ms (D); lateral ST elevation (S_1); and QRS-splintering (S_2), or "LVADS2". Another almost pathognomonic feature of the artifact is an increase in the amplitude of the artifact just before and into the QRS complex. Univariate and multivariable logistic regression models identified significant associations between criteria and LVAD presence/absence (or LVAD vs. V-pacing/lateral MI).

Univariate association of criteria with LVAD vs. VPACE/Lat MI			
		OR	**95% CI**
Low voltage		6.62	(2.82, 15.70)
V-pacing		3.09	(1.27, 8.06)
Artifact		798	(87, 32529)
Duration of QRS > 120ms		0.85	(0.37, 2.00)
S1: lateral ST elevation		4.16	(1.72, 10.04)
S2: splintered complexes		4.94	(1.91, 14.28)
Multivariable LVAD prediction models			
		Beta	**p-value**
Model 1	Intercept	-0.60	0.40
	Low voltage	1.10	0.07
	V-pacing	-0.20	0.75
	Artifact	3.56	<.001
	Duration QRS > 120ms	-0.64	0.40
	S1: lateral ST elevation	0.64	0.23
	S2: splintered complexes	0.27	0.66
	generalized R^2 = 0.89, AUC = 0.99		
Model 2	Intercept	-1.05	0.06
	Low voltage	1.17	0.038
	Artifact	3.47	<.001
	generalized R^2 = 0.88, AUC = 0.98		

We examined 100 controls with acute/ lateral MIs or V pacing. Under univariate examination, all criteria except QRS duration were found to characterize an LVAD-ECG. The Artifact and Low Voltage criteria yielded the greatest association and were independent predictors of LVAD presence. LVADS2 ECG-criteria provide a framework for characterizing HMII implantation and establishing a new baseline in patents with LVADS.