had severe PH (PAM ≥50 mm Hg). All patients had a sinus or paced atrial rhythm. There was a significant correlation coefficient between S2 intensity at the pulmonic area (left upper sternal border) and the PASP ($r = 0.34$; $P = .0097$). The correlation between PASP and S4 intensity at the left sternal border was significant ($r = 0.37$; $P = .030$). S3 intensity measured from the left sternal border was more weakly associated with PASP ($r = 0.28$; $P = .037$). The magnitude or variance of S2 splitting was not associated with PH.

Conclusions: Computerized assessment of the S2, S3, and S4 intensities over the right ventricle correlates with invasive measurements of PASP. Further refinement of acoustic cardiography may serve as a noninvasive tool to assess the severity of PH.

doi:10.1016/j.jelectrocard.2009.08.037

Evaluation of computer algorithm performance in culprit artery identification—comparison with expert readers' analysis in acute myocardial infarction

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Introduction: Morphologic electrocardiogram (ECG) analysis, including prediction of the culprit artery, is an essential part of the decision-making process in acute coronary syndromes (ACS). Computer-based diagnostic ECG algorithms may assist such analysis, especially in the Emergency Department and in the prehospital setting. This study compares the performance of two experienced electrocardiographers with newly developed computer algorithm in prediction of the infarct-related artery, as assessed by coronary angiography.

Method: A total of 720 patients, admitted for definite or possible ACS, who underwent coronary angiography and had flow limiting lesions and recorded "infarct-related artery" were screened. Exclusion criteria were paced rhythm (n = 14), left bundle branch block (n = 33), left ventricular hypertrophy (n = 92), wide-complex tachycardia (n = 3), evolving MI and other Non-STEMI (n = 367) based on computer algorithm detection. The study population (n = 211) consists of patients with STEMI (n = 191) by the new AHA/ACC Guidelines, and Global subendocardial ischemia/MI (n = 20). Admission ECG (standard 12-leads + V4R, V8 and V8R) from each patient was analyzed by two experienced electrocardiographers (KN & YB) and also by Philips DXL algorithm. "Infarct-related artery" identified by coronary angiography served as "gold standard".

Result: Expert electrocardiographers' reading and DXL algorithm's result were tested against "infarct-related-artery (LAD, RCA, LCx, left main/multivessel disease)" as identified by angiography and also compared with each other. Testing against the "Gold Standard", the agreements are 74.9%, 74.4% and 78.7% for ECG expert 1, 2 and DXL respectively combining all culprit arteries. Among the STEMI and Global Ischemia cases as agreed by both, the two experts reached an agreement of 91% (159/175). The DXL algorithm reached 85% (155/182) and 84% (158/188) agreement with both experts respectively.

Conclusion: The computer algorithm performance was comparable to those of expert electrocardiographers. The Philips DXL algorithm performance in comparison with experienced ECG experts showed promising results in predicting culprit artery in ACS.

doi:10.1016/j.jelectrocard.2009.08.038

Fundamental frequency and regularity of cardiac electrograms with Fourier organization analysis

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Background: Dominant frequency analysis (DFA) and spectral organization analysis on cardiac electrograms (EGM) are receiving much attention to establish clinical targets for cardiac arrhythmia ablation. However, previous spectral descriptions of the EGM have been constrained to the 0- to 30-Hz band; in doing so, they often discard relevant information, as the harmonic structure, the spectral envelope, or the presence of several organized mechanisms.

Objective: Our aim was to give a full-band description of the spectral features in EGM recordings that accounts for the information contained in their harmonic structure.

Methods: A simulation computer model was used to generate unipolar and bipolar EGM in the following conditions: plane wavefront, single- and multiple-focal activity, anchored rotor, and fibrillatory activity. For these simulated EGM, a full-band spectral description was obtained, which consisted of parameters measuring periodicity (cycle length [CL], fundamental [f_o], and dominant frequency [f_d]), spectral envelope (normalized power peaks [P_n]), organization (organization [oi] and regularity index [ri]). The possible presence of several physiologically independent components was considered for the first time in this setting (multiplicity index [mi]).

Results: In the presence of harmonic structure, averaged cycle length was more clearly determined when using fundamental frequency, rather than dominant frequency. Spectral envelope was modified by both the acquisition lead system configuration and the nature of the underlying electrophysiologic process. Finally, indices for quantifying organization were strongly sensitive to the consideration of the harmonic structure in their definition.

Conclusion: The consideration of full-band spectral descriptions, specially the existence of clear interharmonic spectral structure and multiple fundamental components, can make the spectral measurements currently used for dominant frequency analysis and organization analysis more robust.

doi:10.1016/j.jelectrocard.2009.08.039

	Plane wavefront		Focal activation		Anchored rotor		Fibrillatory		Double focal	
	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar
CL (ms)	400	400	400	400	250	250	125	143	181	153
1/CL (Hz)	2.5	2.5	2.5	2.5	4	4	8	6.9	5.52	6.53
f_0 (Hz)	2.54	2.54	2.44	2.44	4.00	4.00	5.18	5.18	5.66	5.66
f_d (Hz)	5.08	4.98	4.98	4.98	4.00	4.00	7.32	7.42	5.57	5.76
$P_n(f_0)$ (×1000)	8	42	15	48	39	95	5	12	56	54
$P_n(f_d)$ (×1000)	32	54	38	56	39	95	51	39	56	57
Oi	0.80	0.95	0.89	0.98	0.62	0.83	0.26	0.36	0.67	0.58
Ri	0.25	0.47	0.31	0.51	0.31	0.72	0.43	0.34	0.55	0.46
Mi	–	–	–	–	–	–	–	–	0.96	0.96