

Poster Session 1

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Detection of Acute Myocardial Ischemia using High-Frequency QRS Analysis

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Monitor Atrial Fibrillation Burden Using a Miniaturized ECG Recorder

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Laura Burattini, Polytechnic University of March, Ancona, ITALY

Role of Spatial Dispersion in Electrocardiographic T-wave Alternans Identification

Sandeep Dhillon, Beth Israel Medical Center, New York, NY, USA

Effectiveness of the Telemetry Guidelines in Predicting Arrhythmia Event Rate

Stilianos Efstratiadis, University of Utah Hospitals and Clinics, Salt Lake City, UT, USA

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Faraj Faour, Beth Israel Medical Center, New York, NY, USA

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Dewar Finlay, University of Ulster, Belfast, NORTHERN IRELAND

Visualization of Surface Potential Correlations in the Suggestion of Alternative Recording Sites for Standard Limb Leads

Shadi Karabsheh, University of Utah, Salt Lake City, UT, USA

Acoustic Electrocardiographic Indices of Transmyocardial Ischemia

Damon Kelly, Philips Healthcare, Thousand Oaks, CA, USA

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Digital Pacer Detection and Performance Study

Alexander Schirdewan, Charité, University of Berlin, Berlin, GERMANY

Changing of Cardiac Repolarization Pattern in Response to Thoracic Electrical Shock Application

Peter Scott, Royal Victoria Hospital, Belfast, NORTHERN IRELAND

Deriving a Reduced Lead System from the 80-Lead Body Surface Map in the Electrocardiographic Determination of Acute Myocardial Infarction

Peter Scott, Royal Victoria Hospital, Belfast, NORTHERN IRELAND

Replacement of the Precordial Leads of the 12-Lead Electrocardiogram May Improve Detection of ST Segment Elevation Myocardial Infarction

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Inferior and Lateral Leads Show Similar Tpeak-Tend Intervals in Sotalol-Induced QT Prolongation

Detection of acute myocardial ischemia using high-frequency QRS analysis

Guy Amit, Itzik Pinhas, Nechi Almog, Shimon Abboud, Eran Toledo, (Research and Development, BSP Ltd, Tel Aviv, Israel)

Background: Myocardial ischemia causes changes in the depolarization phase of the ECG, which can be quantified by analyzing the high-frequency mid-QRS components (HFQRS). Our aim was to test this technique in detecting supply ischemia caused by prolonged intracoronary balloon occlusions and assess the feasibility of HFQRS detection of acute ischemia using a single, unreferenced measurement.

Methods: High-resolution 12-lead electrocardiogram was recorded before and during prolonged intracoronary balloon occlusion in 104 patients (60 ± 11 years old, 65 men) undergoing elective PTCA (STAFF3 database). The HyperQ™ System (BSP Ltd, Israel) was used to derive HFQRS data and ST-segment levels. Indices of HFQRS based on (i) relative intensity reduction and (ii) ischemia-specific signal morphology without a reference measurement were examined. The area under the receiver operating characteristic curve (AUROC) was used to assess the diagnostic value of each index and to derive optimal cutoff values. ST changes were examined according to ESC/ACCF/AHA guidelines.

Results: Balloon occlusions lasted 4.4 ± 1.3 minutes. HFQRS intensity index was available in 87 patients, morphologic index in 64 patients, and ST analysis in 99 patients. Both HFQRS indices were more sensitive than ST analysis (see table below), with similar specificity for the HFQRS intensity index and ST analysis.

Index	Sensitivity	Specificity	Accuracy	AUROC
HFQRS intensity	95%*	96%	96%*	0.99
HFQRS morphology	84%*	80%	82%*	0.88
ST segment analysis	55%	95%	75%	NA

* $P < .001$ vs ST analysis.

Conclusion: HFQRS analysis provided high diagnostic performance in detecting acute supply ischemia. In particular, HFQRS morphology index achieved high accuracy without using a baseline measurement. Thus, HFQRS analysis may aid in detecting both transient ischemic episodes and conditions of acute myocardial ischemia/infarction.

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Monitor atrial fibrillation burden using a miniaturized electrocardiographic recorder

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Background: Improved therapeutic decisions based on accurate monitoring of daily atrial fibrillation (AF) burden may reduce hospitalization, symptoms, and strokes. Continuous long-term monitoring of patients at risk of AF could benefit from a noninvasive miniaturized device. This study evaluates the potential for using such a device along with a novel algorithm to monitor AF burden.

Methods: Electrocardiograms (ECGs) were recorded from 48 patients with cardiac-related symptoms at emergency department, General Hospital of Vienna, using a prototype investigational device provided by Philips Healthcare. This device is a 3-channel ECG recorder integrated with a unified electrode with the largest dimension less than 10 cm. Recordings (length = 292 ± 238 minutes, 50-1110 minutes) were analyzed by experts to mark AF episodes. From 48 recordings, 10 were AF (10 episodes, 2693