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MyoVista
The Power of Wavelet Signal Processing

Journal Abstract

MACHINE LEARNING FOR ELECTROCARDIOGRAPHIC DIAGNOSIS OF LEFT VENTRICULAR EARLY DIASTOLIC DYSFUNCTION
Editorial Comment

Authors
Bax JJ, van der Bijl P, Delgado V

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Purpose/Premise
This paper reports on a machine learning algorithm that has been applied to find relevant data points in features acquired from an ECG signal, particularly as they relate to early diastolic dysfunction.

Materials and Methods
The authors reviewed a study involving advanced signal processing in combination with machine learning techniques to diagnose early diastolic dysfunction. The study used a 12-lead electrocardiogram on 188 patients who had been referred for coronary computed tomography. A method similar to Fourier analysis was used to deconstruct the ECG signals..

Discussion/Outcomes
Some of the key points discussed included:

- Early diastolic dysfunction is a significant predictor of all-cause mortality.
- The earliest known indicator of diastolic dysfunction is an impairment of myocardial relaxation.
- Wavelet transform signal processing has not been used for diagnosing early diastolic dysfunction.
- Early diastolic dysfunction is known as a precursor to heart failure with preserved ejection fraction (HFpEF).
- To help prevent or minimize the progression to HFpEF, the focus should be on analyzing
    1) its natural history;
    2) the impact of modifying risk factors and pharmacological agents; and
    3) the benefits of abating or preventing the progression of the disease.
- This process can be enhanced by an efficient screening tool.
- Biochemical markers of diastolic dysfunction have been shown to have only modest sensitivity (75%) and low specificity (69%) for early diastolic dysfunction.
- ECG alone was more cost effective than using these markers to detect dysfunction of the left ventricle in patients at risk for heart failure.

Conclusion/Recommendation

The authors conclude that:

- Biochemical markers are not likely to be cost effective for screening lower-risk patients.
- Signal-processed, machine-analyzed ECG could potentially outperform biochemical markers.
- Signal-processed, machine-analyzed ECG might become an important tool to identify early diastolic dysfunction and coronary artery disease in daily clinical practice.
- Information obtained from a signal-processed, machine-analyzed ECG is more valuable than that obtained from visual interpretation of of traditional ECG, expanding the diagnostic use of the ECG.

HeartSciences
550 Reserve Street
Suite 360
Southlake, TX 76092 USA
Tel: (+1) 682-237-7781
Fax: (+1) 817-796-2075
HeartSciences.com

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