Cooper Innovation Center

Cooper University Health Care

Cooper Medical School of Rowan University

Wearable multimodal sensory system to monitor cardiac health for early detection of CHF

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Brief Description

A non-invasive system and method to monitor cardiac parameters, specifically lusitropic myocardial function (relaxation) in relation to inotropic myocardial function (contraction) on a beat by beat basis in order to assess myocardial well - being or pathology on a real time basis.

Problem

Cardiovascular diseases are the leading cause of death both in the U.S. and worldwide. Between 2014 and 2015, the US economy spent ~$219B on diagnosis and treatment of heart disease with the direct domestic medical costs associated with **congestive heart failure (CHF)** alone expected to reach $53 billion by 2030, with the majority of costs related to hospitalization.

Solution

With an "early warning" a patient may be instructed to adjust their behavior, diet and medication to ***avoid* hospitalization**. Heart health monitoring through this proposed inexpensive mobile health platform has the potential to provide an early warning to the 65 million persons worldwide currently living with CHF as well as offer the hope of **pre-symptom diagnosis and prevention**. This inexpensive technology has the potential to reduce healthcare disparities for underserved populations.

Technology

Electrocardiography (ECG) is a well-established and broadly useful method for diagnosing certain heart conditions and incorporated into mobile devices. However many heart conditions, such as CHF, are not sensitively detected by ECG alone. Seismocardiography (SCG) monitors the mechanical movement of the heart. In this technology ECG and SCG are collected from sensors in a wearable device and analyzed in conjunction to provide novel insights into efficient cardiac function. This type of diagnostic information is currently only available in a snapshot taken through a 2-D echocardiogram, administered in a healthcare setting by a healthcare professional. Clinical proof of concept has been achieved in a large animal model as well as in a pilot clinical study using a custom research grade device (retail component cost $67). Studies are being planned for further clinical proof of concept with CHF patients and at risk populations using a commercial device (cost ~$150).

Advantages

Wearable – at home monitoring
Strong IP position
Works with existing proven device technology
Addresses a large unmet need

Stage of Development

Human proof of concept (pilot study)
Preclinical Discovery

Intellectual Property

US Utility Patent #10,085,665
US Utility Patent #10,918,300
US Utility Patent Application
US Provisional Patent Application: (Confidential)

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