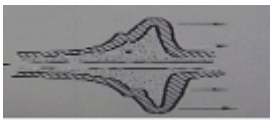
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Local Pulsewave Velocity Measurement Using a Linear Array

TECHNOLOGY NUMBER: 3529



OVERVIEW

Non-invasive ultrasound technique for local measurement of arterial compliance.

- Detects local changes in arterial compliance with greater precision and accuracy
- Early diagnosis of cardiovascular diseases, diabetes, and renal failure

BACKGROUND

Cardiovascular disease (CVD) is the leading cause of death in the United States, significantly affecting the quality of life for many. One crucial indicator of vascular health is pulse wave velocity (PWV), the speed at which the pressure wave from heart contractions travels through the arteries. Traditionally, PWV measurements are taken between two distant points in the vasculature, providing only an average estimate of arterial compliance. However, early atherosclerosis manifests as small, localized fibrous lesions along the vascular walls, which these traditional methods fail to detect. As a result, early-stage disease often goes unnoticed, delaying intervention and increasing the risk of severe health consequences. A method for detecting these local changes in compliance early on is urgently needed to improve diagnostic accuracy and treatment outcomes.

INNOVATION

Researchers at the University of Michigan have developed a novel method using standard ultrasound imaging equipment to measure local arterial pulse wave velocity (PWV) and intramural strain. This non-invasive technique allows for the local assessment of the elastic modulus of arterial walls, providing enhanced resolution, precision, and accuracy. By capturing both PWV and intramural strain at the same location, the method can determine the intrinsic elastic modulus, effectively distinguishing between healthy and diseased vasculature. This technology enables the early detection of reduced arterial compliance, a marker for diseases such as cardiovascular disease, diabetes, and renal failure. Potential applications include routine health screenings, early diagnosis of atherosclerosis, and timely interventions to

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Category
Medical Devices
Life Sciences

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prevent disease progression, ultimately improving patient outcomes and healthcare efficacy.

ADDITIONAL INFORMATION

REFERENCES:

M. O'Donnell, K. Kim, W. F. Weitzel, C. Jia, J. M. Rubin and T. J. Kolias, "6G-6 Local Nonlinear Arterial Elastic Modulus Reconstruction From In Vivo Strain Imaging and PWV," 2006 IEEE Ultrasonics Symposium, Vancouver, BC, Canada, 2006, pp. 728-731, doi: 10.1109/ULTSYM.2006.195.

INTELLECTUAL PROPERTY:

US8167804B2 "Measurement of tissue elastic modulus"