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A Method for Measuring Flow Propagation Velocity from Multi-Dimensional Cardiac Imaging

Multi-dimensional cardiac imaging model that reduces flow propagation error by 65%.

Researchers at Purdue University have developed a new method to measure left ventricular flow (diastolic function) using cardiac imaging. Normal left ventricular relaxation creates a pressure drop from the mitral orifice toward the apex. However, with left ventricular diastolic dysfunction (LVDD), left ventricle relaxation is impaired, reducing the pressure and slowing the flow propagation. The current approach to analyze left ventricular flow is a 1-dimensional model. The Purdue researchers' model is spatially 3-dimensional (4-dimensional when considering time), providing a median absolute flow propagation error 65% lower than the standard model. The researchers' 4-dimensional model resolves the complete spatial and temporal distribution of flow, aspects which are not available with the current technique. This technology will benefit the diagnosis of ventricular diastolic function.

Technology Validation: The Purdue researchers' method was demonstrated to have 65% lower flow propagation error than the conventional model.

Related Publications: Abstract 13216: Evaluation of Left Ventricular Flow Propagation Velocity from Multi-Dimensional Cardiac Imaging. Jiacheng Zhang, Brett Meyers, Melissa Brindise, Yue-Hin Loke and Pavlos Vlachos. Circulation. 2022;146:A13216

Advantages:

- 4D model (spatially 3D)

- Lower error

Applications:

Technology ID
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Category
Digital Health & Medtech/Medical Image Processing

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View online

- Left ventricular flow analysis of images obtained from color

- Doppler or phase-contrast magnetic resonance imaging

TRL: 4

Intellectual Property:

Provisional-Gov. Funding, 2022-09-08, United States

PCT-Gov. Funding, 2023-09-07, WO

NATL-Patent, 2025-03-07, United States

Keywords: Color Doppler Imaging, Computer Technology, Flow Propagation, Left Ventricular Diastolic Function, Phase-contrast Magnetic Resonance Imaging