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Algorithm to improve diagnostic accuracy of pulmonary hypertension using echocardiography

Stanford researchers have developed a next-generation computational algorithm for diagnostic of pulmonary hypertension (PH) that provides an estimate of the tricuspid regurgitation (TR) velocity (V_{max}) with increased accuracy and confidence. Non-evasive diagnosis of PH often relies on estimation of pulmonary pressures obtained using Doppler echocardiography. However, interobserver variability of the estimated pulmonary pressures and lack of mathematical understanding of underlying TR waveform call for a more robust and reliable computational method to extrapolate TR signals.

The Stanford group designed a new computational algorithm that utilizes the cubic polynomial interpolation method as a physiological approach to TR waveform analysis. This method provides a much more reliable estimation of pulmonary pressure and V_{max}, and it outperforms the current multivariable regression model especially in clinical settings with incomplete or variable signals. The new interpolation method provides quality control in clinical practice and can be incorporated into automated Doppler machines for improved PH diagnosis.

Applications

- Computational algorithm for current Doppler machines
- Analytical tool for clinical diagnosis of pulmonary hypertension
- Analytical software for other medical devices involving extrapolation of signals

Advantages

- Robust computational method for clinical estimation of tricuspid regurgitation velocity
- Effective extrapolation of TR signal for additional prognostic information
- Easy implementation into the current Doppler machines and other technologies

Patents

- Published Application: 20230225696

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