

Predicting Sudden Cardiac Death



Physicists at Tampere University have developed a new computational method to estimate the risk of sudden cardiac death from a one-minute heart rate measurement at rest. This study was a collaborative effort between experts in cardiology and computational physics, who developed the method using time series analysis.

Sudden cardiac death often occurs without prior symptoms and can affect young, healthy individuals, sometimes during strenuous sports activities. Early identification of at-risk individuals is crucial for preventive treatment. While wearable devices like smartwatches can measure heart rate, the existing heart rate interval analyses have not been sufficiently accurate for predicting sudden cardiac death.

Traditionally, the risk has been assessed using stress test parameters, such as cardiorespiratory fitness and recovery heart rate. Cardiorespiratory fitness measures the body's efficiency in transporting and utilising oxygen during physical activity.

Researchers at Tampere University have found a new computational method that provides a significantly better estimate of the long-term risk of sudden death using just one minute of heartbeat interval data at rest. This finding is based on stress test data from approximately 4,000 patients collected by the Finnish Cardiovascular Study (FINCAVAS) project.

The study revealed that patients with abnormal heart rate variability, identified through the new method, had a significantly higher incidence of sudden death compared to those with normal heart rate characteristics. The analysis also accounted for other risk factors.

This tool shows great promise for pre-diagnosis and identifying high-risk patients. It could be easily integrated into wearables like smartwatches or smart rings, as it does not rely on other measurements.

Study authors believe that many previously asymptomatic individuals who suffered sudden cardiac death or were resuscitated after sudden cardiac arrest could have had their risk factors detected and addressed in time with this method.

An interesting finding is the identification of differences during rest measurements. The heart rate interval characteristics of high-risk patients at rest resemble those of a healthy heart during physical exertion.

The research and development of this method are ongoing, with efforts to expand its application to databases on different heart diseases. The goal is to reliably identify overall risk and specific heart diseases, such as heart failure.

Source: [Tampere University](#)

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