Novel research reveals 'stiffer' blood vessels may increase risk of heart attack

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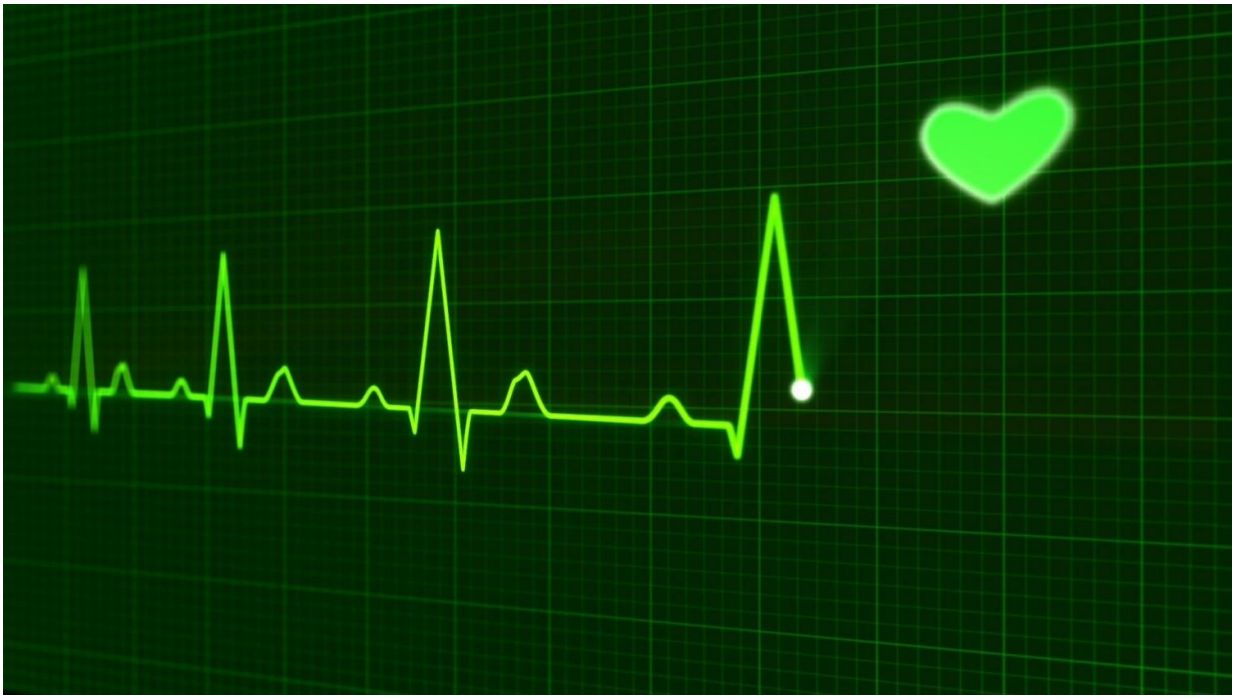

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Using cutting-edge computational methods, Macquarie University researchers have found that blood vessel 'stiffness,' or distensibility is an important determinant of blood flow, and can potentially alter outcomes for patients.

- Simulating blood flow in the vessels that supply the heart,

researchers found that those with less distensibility have impaired blood flow.
- Findings demonstrate that greater distensibility allows coronary heart disease patients to better "compensate" for disease progression and blood vessel narrowing.
- Coronary heart disease is the leading cause of death in Australia, hence the potential significance of these findings.

New Macquarie University research has revealed, for the first time, the role that blood vessel 'stiffness', or distensibility, may play in influencing the outcomes for Australians living with coronary heart disease – the country's leading cause of death.

The Cardiac Computational Fluid Dynamics Core Laboratory group at Macquarie University have shown that distensibility is of clinical importance, and therefore, may change the way we think about risk factors for coronary disease patients and may allow for earlier intervention before negative events occur.

The research – entitled "The relationship between coronary artery distensibility and fractional flow reserve" – was published in late July 2017 in the prestigious *PLOS ONE* journal.

"Until now, there had been only a handful of studies that evaluated the effects of distensibility in patients with heart disease" said Dr. Andy Yong, of Macquarie University.

"Moreover, the true clinical impact of distensibility had not been widely-acknowledged. We are the first to show that measuring distensibility may be of clinical importance."

The researchers used cutting-edge methods, which were developed in-house, to generate highly accurate computer models that mimic blood

vessels of the heart in real life. This enabled them to study how different conditions may affect blood flow. They also studied blood flow within a group of 104 patients with heart disease to validate their findings.

"If we were to put it another way: say, hypothetically, two coronary heart disease patients both have the same level of blood vessel narrowings, it is the one whose vessels were better-able to distense, or stretch, that we would expect to have better outcomes, and be less-likely to suffer a heart attack. That is a breakthrough finding," Dr. Yong continued.

"While the participants of the study were all currently living with coronary heart disease, it is the broad-scale potential of these findings beyond just those known to be at-risk of disease, in terms of medical intervention techniques, diagnostic options and treatments that are most exciting".

When the blood vessels narrow to significant degrees, patients experience symptoms such as chest pain, and severe narrowing eventually leads to heart attacks. What this research suggests, therefore, is that patients with stiffer vessels are more likely to develop symptoms earlier and suffer heart attacks in the future.

Coronary heart disease currently affects 1.2 million Australians and is the leading cause of death in Australia. According to the National Heart Foundation, the disease kills one Australian every 27 minutes, making any research in the space extremely important.

More information: Heart Disease in Australia. www.heartfoundation.org.au/abo … disease-in-australia

Provided by Macquarie University