Risk factors for heart disease change heart structure and appearance

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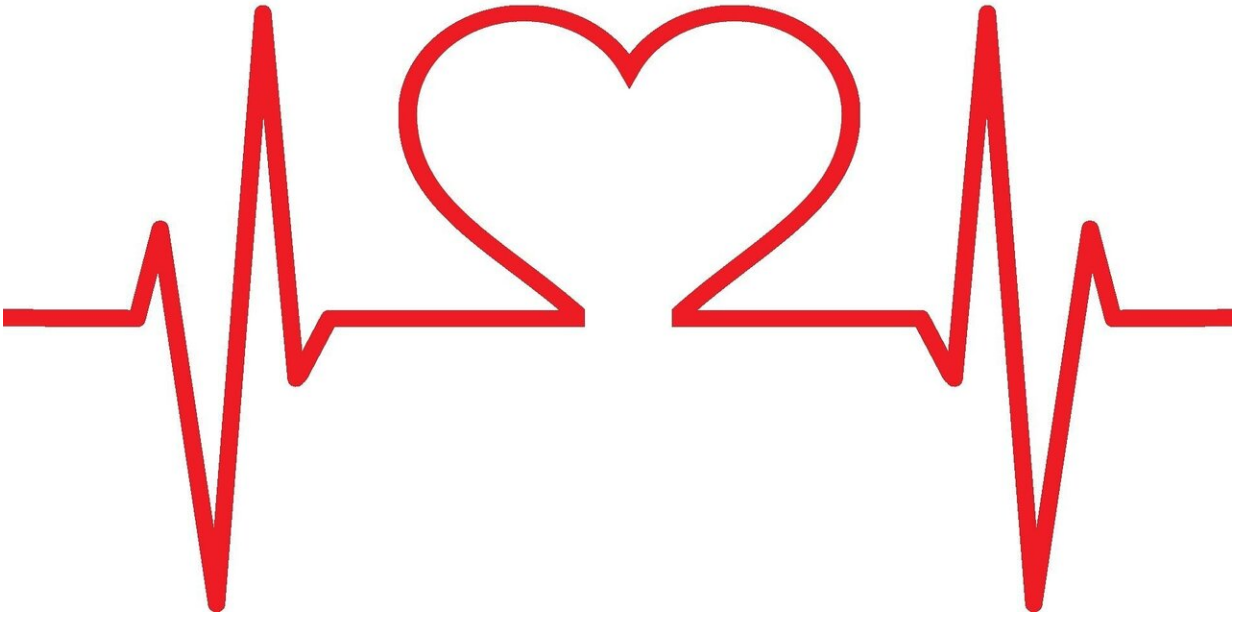

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A new study led by researchers at Queen Mary University of London suggests that certain risk factors for heart disease are linked to common changes in the structure and appearance of the heart.

Risk factors for heart disease including male sex, diabetes, high blood pressure, high cholesterol and smoking were linked to a darker appearance of the heart muscle, as well as a change in its texture.

For the study, researchers analyzed images from heart magnetic resonance imaging (MRI) scans using a new toolkit called radiomics, developed in collaboration with the University of Barcelona, to get highly detailed information about the shape and texture of the heart.

Using their novel approach, the researchers studied heart MRI scans from almost 30,000 people from the UK Biobank—a large-scale biomedical database and research resource—to look at the overall shape and structure of the heart in detail. They found that for all the key risk factors studied the heart muscle was darker in appearance and had a smoother, less complex texture.

Men were found to have larger hearts with the heart muscle appearing smoother and less texturally complex in comparison to women. The heart muscle in healthy women was brighter than male hearts with a more complex appearance of the muscle architecture, according to researchers.

Current methods used to image the heart in hospitals are not able to fully reflect complexity of the heart's structure. By applying their new imaging toolkit to MRI scans the researchers were able to look at the structure and texture of the heart much greater detail than is possible using existing standard techniques.

Dr. Zahra Raisi-Estabragh, NIHR Clinical Lecturer in Cardiology at Queen Mary and lead author, said: "Our findings provide new insights into the impact of risk factors on the heart and identify differences in the size, structure, and appearance of hearts between healthy men and women. The study forms part of our wider research program aimed at developing the radiomics imaging toolkit to transform patient care. Our novel approach has the potential to provide faster, more accurate diagnosis of heart disease, improve our estimations of future risk of heart conditions, and better understand the processes underlying

cardiovascular disease."

The researchers are now exploring whether the observed changes in heart muscle translate to higher risk of having significant heart problems, such as heart attacks. "As we've shown that these changes are associated with known major risk factors for heart disease, it's very likely that they represent unhealthy changes to the heart muscle. However more research is needed to confirm this," added Dr. Raisi-Estabragh.

More information: Zahra Raisi-Estabragh et al, Cardiac Magnetic Resonance Radiomics Reveal Differential Impact of Sex, Age, and Vascular Risk Factors on Cardiac Structure and Myocardial Tissue, *Frontiers in Cardiovascular Medicine* (2021). DOI: 10.3389/fcvm.2021.763361

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